

<i>Issue Date</i>	<i>Org. Code</i>
2-5-92	W/OS032

# NATIONAL WEATHER SERVICE

## Engineering Handbook

<i>Program</i>	<i>Part</i>	<i>Section</i>
EHB-11	03	3.3

### MODIFICATION INDEX - RAMOS

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5	May 30, 1984	Installation and Programming Instructions for HANDAR 540A Data Collection Platform (DCPH)
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6	June 1, 1984	Installation of Direct Connect Coupler (DCC), (MM110)
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7	October 12, 1984	RAMOS Voltage Monitor Module
8	October 15, 1984	RAMOS/T Battery Monitor and Identification Module (S010-1A1A4) Precip Counter Reset Problems

December 26, 1977  
W514

RAMOS MODIFICATION NO. 1  
(For Electronics Technicians)

SUBJECT : Installation of Fuse on Power Supply Module

PURPOSE : Prevents R3 from burning the printed circuit board should either the Oscillator C-OSC-1 or the Push-Pull Amplifier Q1 PPA-1 fail

EQUIPMENT AFFECTED : All RAMOS

PARTS REQUIRED : 2 Fuse Clips, Littlefuse #102069  
1 Fuse, 1 amp., Slo-Blo, Littlefuse 1-3AG

Fuse clips will be provided upon receipt of NOAA Form 37-4 at CLSC. Indicate "RAMOS Mod. 1" on the NOAA Form 37-4. Fuse is in the Replacement Item Kit supplied to RAMOS Stations and is marked item 43X017

TIME REQUIRED : 2 Man-hours

General: This modification is to be performed on all Power Supply Modules (1A1A1) in the Basic Electronics Assembly. Installation of the fuse will aid in preventing resistor R3 from burning the printed circuit board.

PROCEDURE:

1. Turn off the power to the BEA and remove the Power Supply Module 1A1A1. Place the printed circuit board on a suitable working surface.
2. Using the fuse and fuse clips as a guide, mark and drill four (4) .0625 (1/16) inch diameter holes as shown on the printed circuit board artwork. See Figure 1a.
3. Remove the protective coating from the area of the printed circuit board which will be under the fuse clips. See Figure 2a.
4. Remove approximately 1/4" of the land between the fuse clip mounting area as shown on the printed circuit board artwork. See Figure 2a.

EHB-11  
Issuance 78- 1

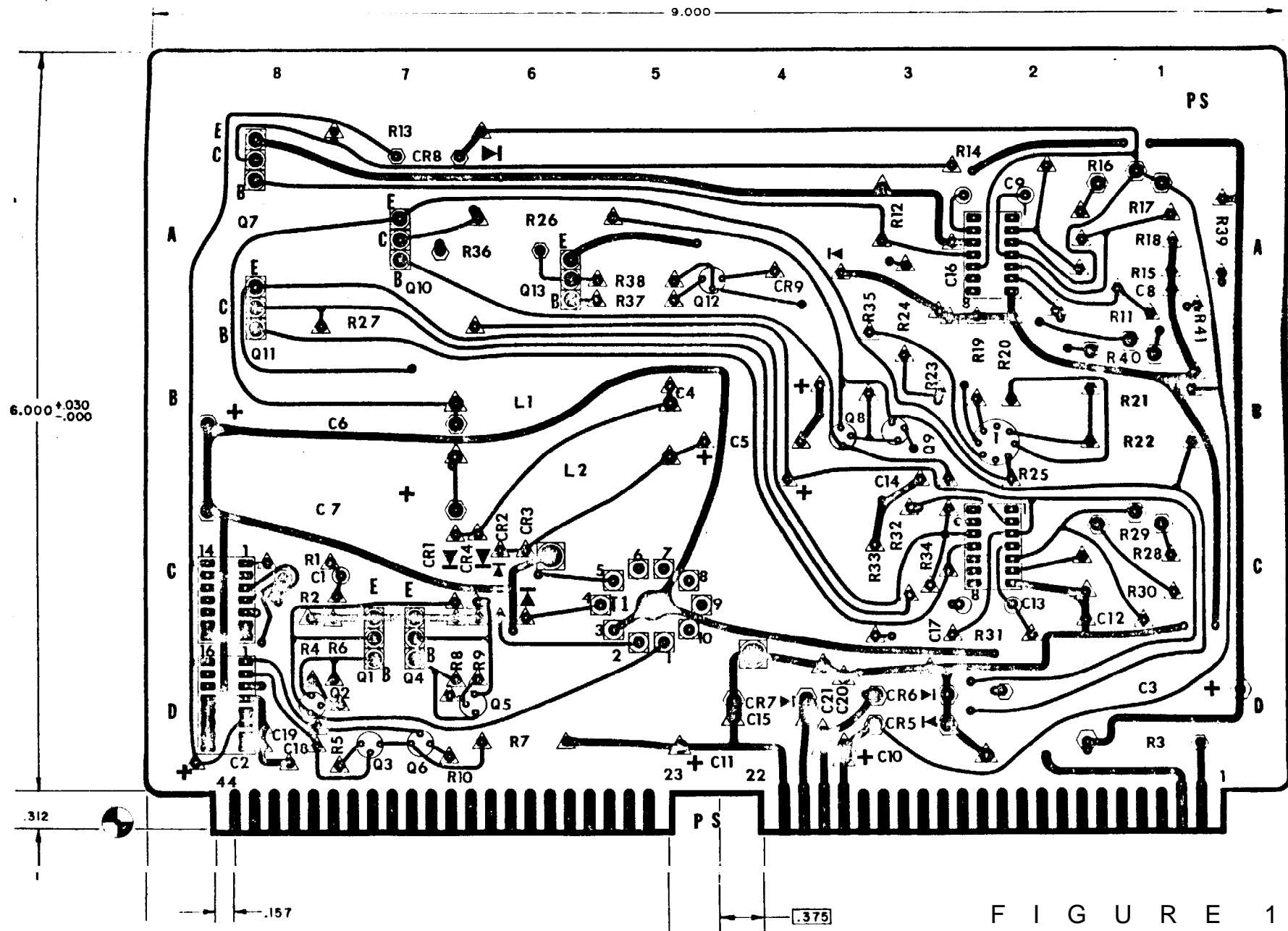
5. Press the fuse clips through the drilled holes on the printed circuit board and bend over the tabs on the back of the board. See Figure 1 b.
6. Solder the fuse clips to the land area. See Figure 2b.
7. Install the 1-amp. fuse taken from the Replacement Item Kit.
8. Return the Power Supply Module back to its proper location in the BEA of the RAMOS as this completes the modification.

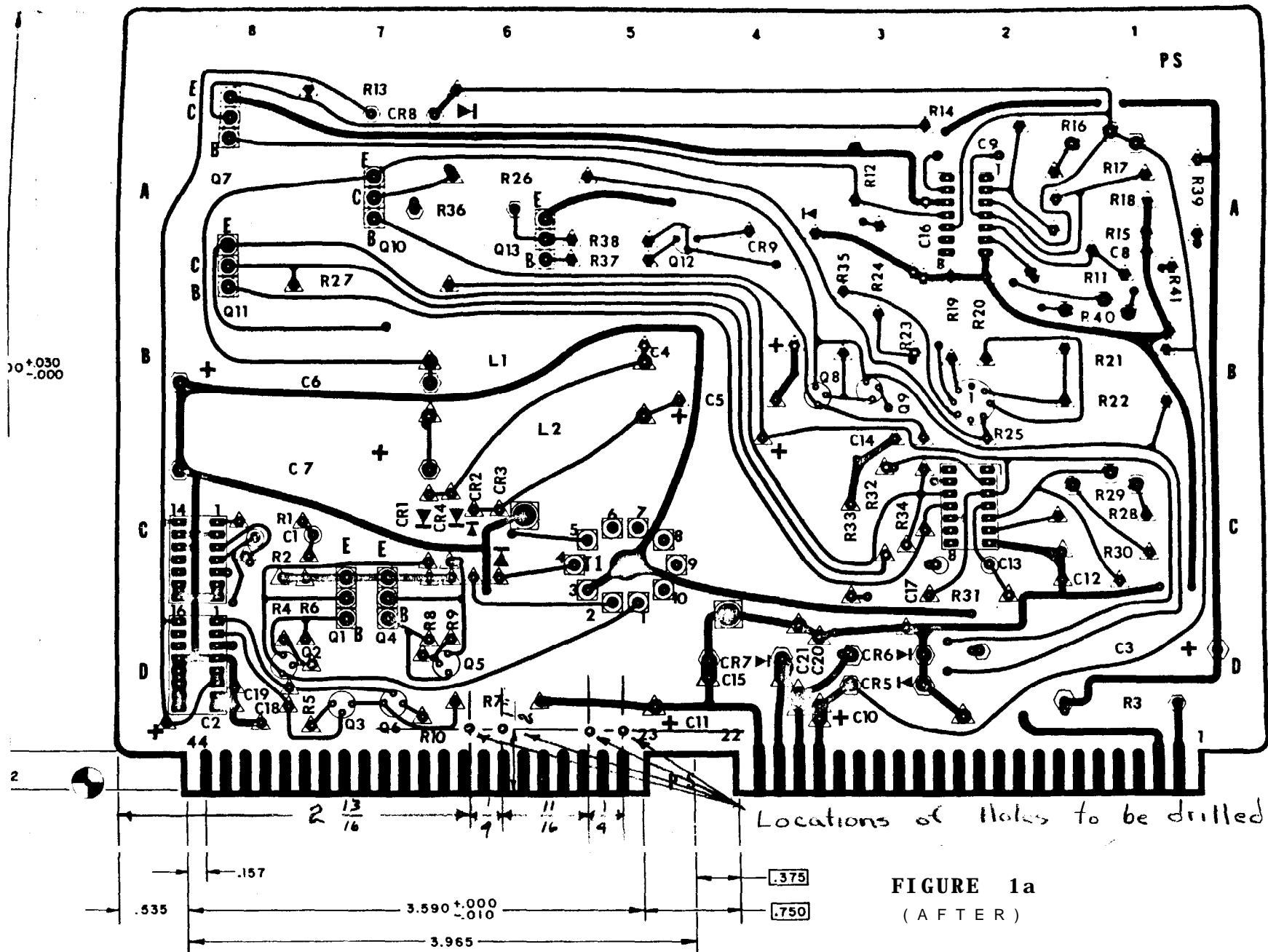
Manual Changes:

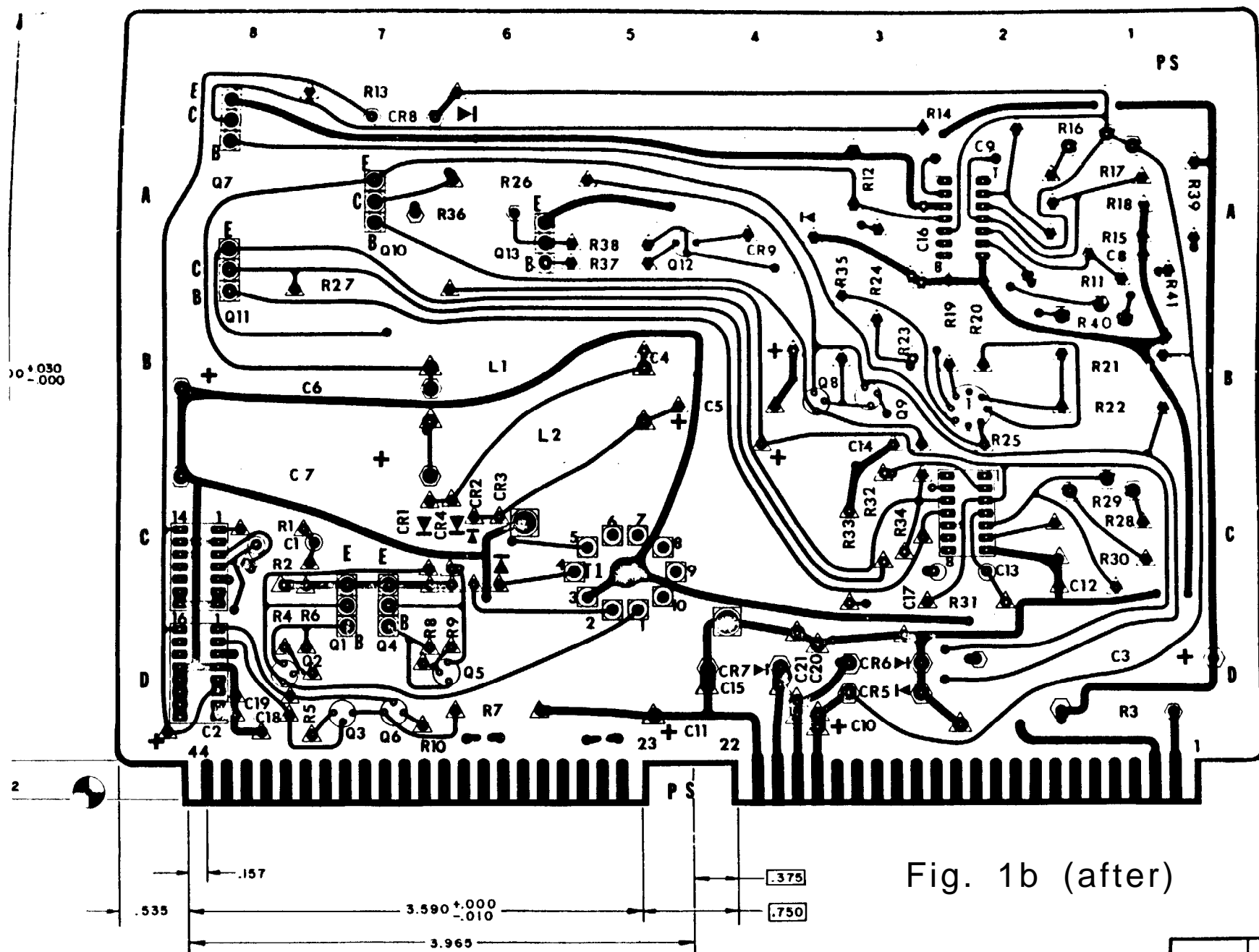
1. RAMOS Instruction Manual II-104, Volume 2,
  - a. Page 2-77; on the line connecting R3 to the emitters of Q2 and Q4, add into the line the symbol for a fuse and label it F1, 1ASB.
  - b. Page 2-82; make the appropriate changes in the printed circuit board artwork corresponding to the artwork in the Modification.
  - c. Page 2-83; insert in the Parts List after CR9 the fuse identification information: "F1, D6, Fuse, Littlefuse 1ASB."

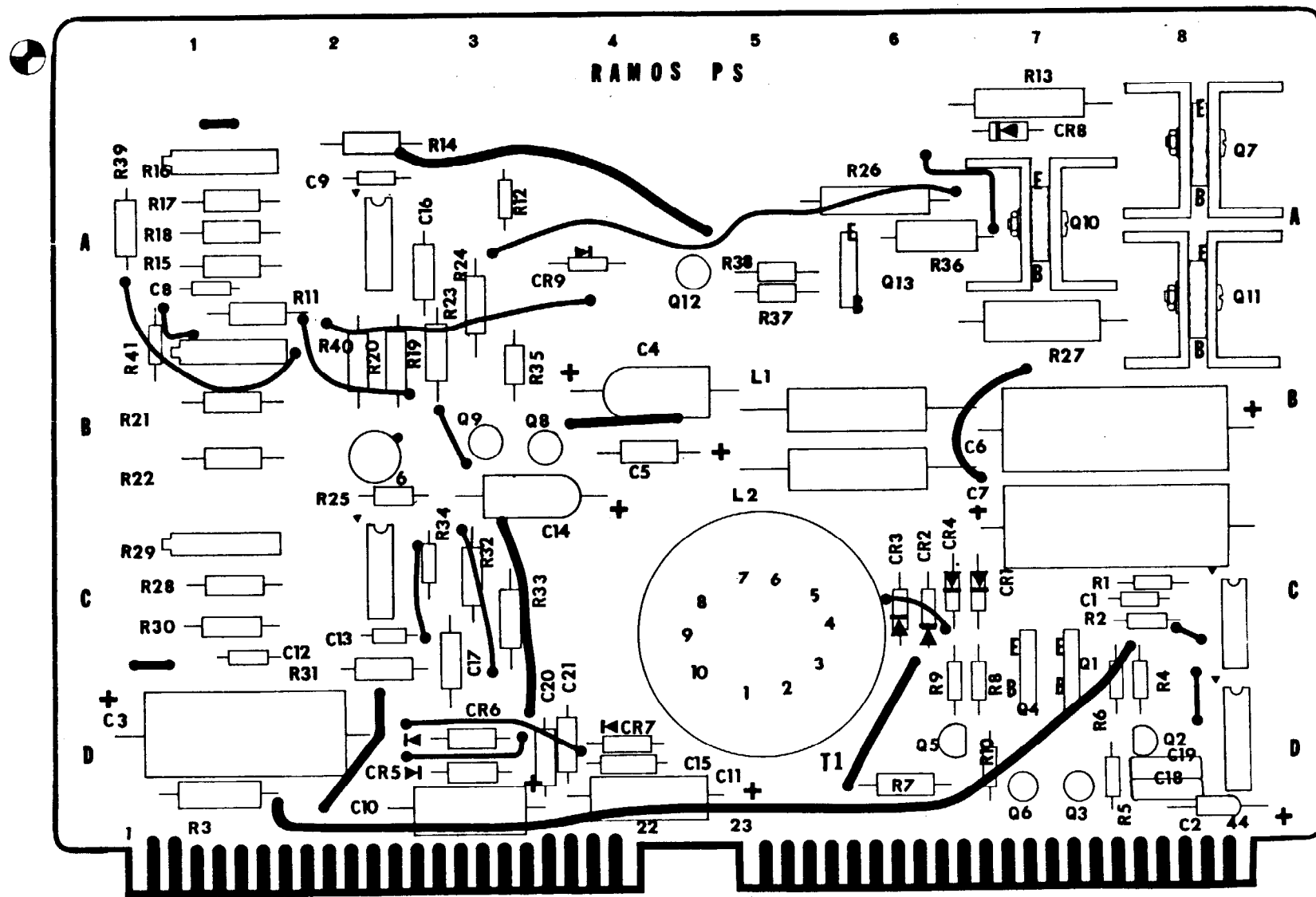
Attachments: Figure 1  
Figure 1a  
Figure 1b  
Figure 2  
Figure 2a  
Figure 2b

Memorandum: Reporting Equipment Modifications







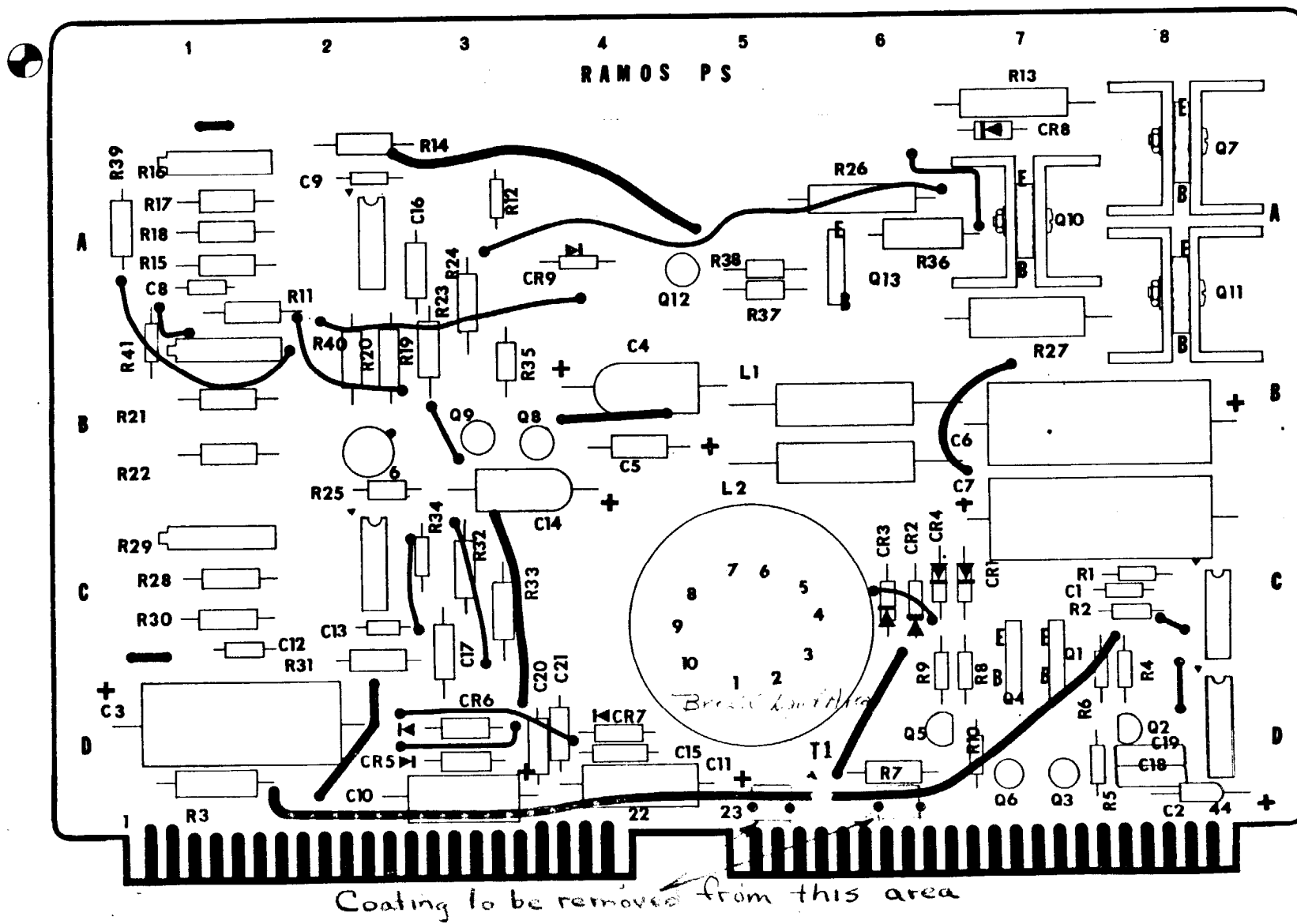


NOTES:

1. FOR SIZE AND DRILL INFORMATION SEE DRAWING NO. S010-FIPSI-DRO03
2. FOR SCHEMATIC SEE DRAWING NO. S010-FIPSI-DRO01
3. COMPONENTS SHALL BE INSTALLED IN ACCORDANCE WITH SPEC. S010-FIPSI-DRO01

FIGURE 2

(BEFORE)



NOTES:

1. FOR SIZE AND DRILL INFORMATION SEE DRAWING NO. S010-FIPSI-DRO03

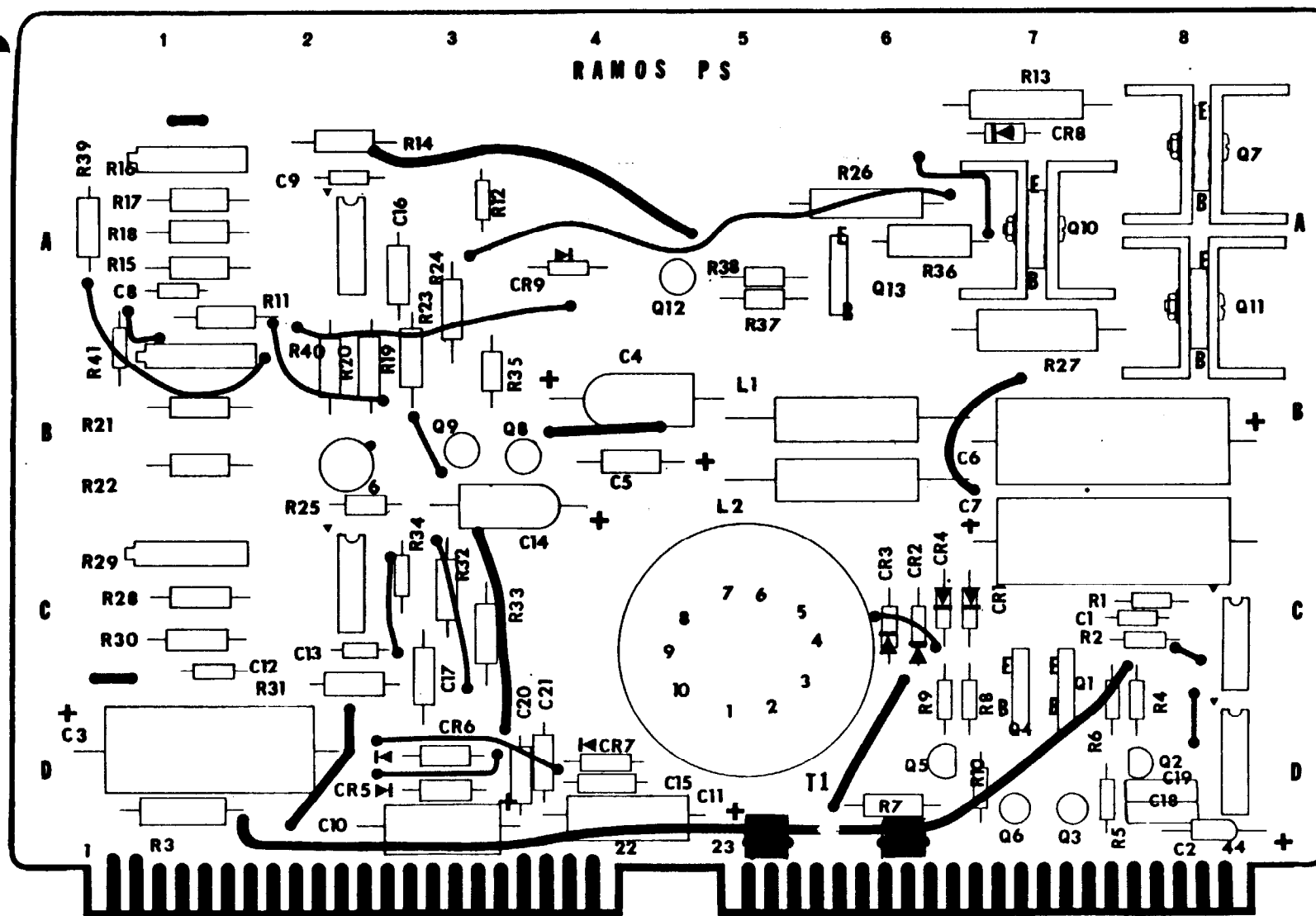
2. FOR SCHEMATIC SEE DRAWING NO. S010-FIPSI-DRO01

3. COMPONENTS SHALL BE INSTALLED IN ACCORDANCE WITH S010-FIPSI-DRO01

FIGURE 2a

(AFTER)





NOTES:

1. FOR SIZE AND DRILL INFORMATION SEE DRAWING NO. 5010-FIPSI-DRO03
2. FOR SCHEMATIC SEE DRAWING NO. 5010-FIPSI-DRO01
3. COMPONENTS SHALL BE INSTALLED IN ACCORDANCE WITH GSFC S-722-P-5.
4. NON STANDARD REFERENCE DESIGNATORS FOR INTEGRATED CIRCUITS, FIND NO. 2 THRU 5 ARE DESIGNATED IN ACCORDANCE WITH THEIR CATEGORIES

FIG. 2b (after)

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**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
NATIONAL WEATHER SERVICE  
Silver Spring, Md. 20910

November 1, 1977

W511/NBG

TO: Roger L. Hill  
Chief, Equipment Maintenance & Modifications Branch, W514

FROM: Richard K. Thi gpen   
Chief, Engineering Data Analysis Branch

SUBJECT: Reporting Equipment Modifications

ACTION: As Indicated

Please attach a copy of the "Instructions for Reporting Equipment Modifications" to all modification notes. These instructions will help the SNS's and others who don't have easy access to the instructions in Engineering Handbook No. 4.

Attachments





UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL WEATHER SERVICE  
Silver Spring, Md. 20910

August 10, 1978

W514

TO: All Regional Headquarters, Electronic Program Officers, and  
Electronics Technicians

FROM: *J. M. St. Clair*  
J. M. St. Clair  
Chief, Engineering Division

SUBJECT: Transmittal Memorandum for Engineering Handbook No. 11,  
Issuance 78- 7

1. Material Transmitted:

Engineering Handbook No. 11 Automatic Observing Equipment, Section ~~3.3~~ 3.3  
RAMOS Modification No. 2, 1 -AMP-2 Multiplexing Op-Amp Resistor  
Change, R6.

2. Summary:

Modification No. 2 instructs the EI Techs to change R6 of 1 -AMP-2 from  
10 megohms to 1 megohm.

3. Effect on Other Instructions:

None.

4. All Completed equipment modifications shall be reported on the H-28  
Engineering Progress Report, according to EHB-4, Part 2, Pages 2-6 and  
15, Issuance 76-1, revised August 15, 1976.

EHB-11  
Issuance 78- 7



Engineering Division

July 13, 1978  
W514RAMOS MODIFICATION NO. 2  
(For Electronics Technicians)

SUBJECT : Resistance Change for R6

PURPOSE : To Prevent Instability in the A-D Converter During the Wind Sampling

EQUIPMENT AFFECTED : All RAMOS

PARTS REQUIRED : One 1-Megohm, 5%, 1/4 Watt Resistor, RCR07G1OS JM, or equal

Resistor replacement for R6 will be purchased locally by the EI Tech responsible.

TIME REQUIRED : 1 Work-hour

General: This modification is to be performed on all Wind Speed Modules (1A1A8) in the Basic Electronics Assembly. The change of value of R6 will aid in stabilizing the A-D converter.

PROCEDURE:

1. Turn off the power to the BEA and remove the Wind Speed Module 1A1A8. Place the printed circuit board on a suitable working surface.
2. Locate R6 at coordinates 2C. With an appropriate soldering iron, remove the 10 megohm resistor and replace it with the 1 megohm resistor purchased locally.
3. Return the Wind Speed Module back to its proper location in the BEA of the RAMOS. Restore the power as this completes the modification.

Manual Changes:

1. RAMOS Instruction Manual 11-104, Volume 2. (a) Page 2-191; Locate R6 at ⑤ 1-AMP-2. with pen and ink, change "10 megohms to 1 megohm." (b) Page 2-197; Locate Reference Designator R6. With pen and ink in the NAME and DESCRIPTION column, change "Same as R4" to read "Same as R7."

Attachment: Instructions for Reporting Equipment Modifications.



**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**

NATIONAL WEATHER SERVICE  
Silver Spring, Md. 20910

December 17, 1979

OA/W5141 - JM

All NWS Regional Headquarters, Area Electronics Supervisors,  
and Electronics Technicians (EHB-11 Distribution)

TO:

FROM:

*J. M. St. Clair*  
OA/W51- J. M. St. Clair

SUBJECT: Transmittal Memorandum for Engineering Handbook No. 11,  
Issuance 79-10

1. Material Transmitted:

Engineering Handbook No. 11 - Automatic Observing Equipment,  
Section 3.3, RAMOS Modification No. 3, Temperature Sensor  
Aspiration.

2. Summary:

Modification No. 3 provides Electronics Technicians with  
instructions for modifying the RAMOS Temperature Sensor with  
an Aspirator.

3. Effect on Other Instructions:

Pen and ink changes to Manual 11-104.

4. Reporting Equipment Modifications:

All completed equipment modifications shall be reported on the  
H-28 Engineering Progress Report, according to EHB-4, Part 2,  
Pages 2 and 15, Issuance 76-1, Revised August 15, 1976.

EHB-11  
Issuance 79-10



RAMOS MODIFICATION NO. 3  
(For Electronics Technicians)

SUBJECT : Temperature Sensor Aspiration

PURPOSE : To Reduce System Errors and Alter Response Time

EQUIPMENT AFFECTED: All RAMOS Temperature Sensors

PARTS REQUIRED :

- 1- Sensor Plate
- 1- Baffle Ring
- 1- Thermal Mass, S010-F3T4
- 1- Template Set
- 1- Template Applications, S010-F3T4-DR005
- 1- Silastic, Tube RTV32
- 1- Fan, Rotron, 3B763ZH
- 1- Cable, 13 FT. Belden 19209
- 1- Capacitor, .5 uf, 100V, 10%
- 1- Clamp, Cable
- 1- Screw, Set, Hex, Cres; M3x0.5
- 1- Ring Terminal No. 4801, H.H. Smith
- 1- Screw, Bind Hd. Cres No. 4-40x3/8
- 3 - Washers, Lock No. 4
- 3- Cleats, Motor Mount, L2-2 PIC Corp.
- 1 - Cutting Snips No. J-7 Wiss & Sons
- 1- Metric Wrench (M-3 Hex Hd.)

This modification will be provided upon receipt of NOAA Form 37-4 at W5141. It will be in a Kit Form and careful attention should be applied to make certain all parts, templates, and tools are on hand before commencing the modification. A pair of cutting snips No. J-7 manufactured by Wiss & Sons will be supplied in the Modification Kit. The snips will be required to cut a hole in the bottom of the inner hat assembly and to enlarge the top hole in this inner hat. The normal complement of Electronics Technicians hand tools will handle the rest of the requirements in the Modification Kit. The metric wrench is not supplied in the kit.

TIME REQUIRED : 2 Work hours

General: During extensive testing at the Sterling Research and Development Center, problems in the Temperature Sensor which are common to the RAMOS, AMOS, and H063 were discovered when the Sensor was compared to an acceptable standard. In an attempt to reduce the number of errors, a modification to aspirate the Temperature Sensor has been devised. A thermal mass is to be added to cover the temperature transducer. This should increase the time constant to about 4 minutes., which is the same time constant before aspiration was added.

EHB-11  
Issuance 79- 10

NOTE: All RAMOS sites will modify the temperature sensor including those without 110V ac. (Stations without 110V ac will run the power cord into the wireway leaving it unconnected and return the thermal mass to W5141/JM.)

PROCEDURE:

1. Unplug the Temperature Connector Plug P112 from J112 in the BEA. This will disconnect the Temperature Sensor.
2. Release the silicone temperature cable from the BEA and wireway trough. The BEA has moisture proof connectors around the cable and is potted with Dow Corning 3140 RTV. The potting material will have to be removed first in order to facilitate removal of the cable.
3. Carefully pull the temperature cable through the Pwrstrut Channel as shown in Figure 3-10 of RAMOS Manual Volume 1.
4. Refer to Figures 3-1 and 3-13 of RAMOS Manual Volume 1. Remove the 3 bolts holding the temperature sensor and remove the Temperature Sensor.'
5. Remove the three screws holding the Temperature Transducer Housing to the inner hat assembly; also remove the screw that is holding the silicone cable to the inner hat assembly. Discard cable clamp.
6. Carefully lay back the Temperature Housing Assembly. Remove the three screws that secure the inner hat assembly. Now the inner hat assembly is free of the outer hat assembly and the Transducer Housing. Clean inner hat assembly with dusting cloth.
7. Refer to Drawing S010-F3T4-DR005. Adhere the large template required to cut the hole in the bottom of the inner hat assembly in the manner suggested. That is the three crosses over the three mounting screw-holes. Release the adhesive portion of the template approximately 2 inches from top. Line up two holes with template. Slowly remove template backing and ascertain that 3rd hole is lined up before removing backing completely. It may be necessary to repeat this operation a few times before the template is positioned properly.
8. Drill a hole in the center of the bottom inner hat assembly large enough to insert the cutting snips. Cut out the hole, as indicated by the Template circle. Remove any remaining portion of the template from the bottom of the inner hat assembly.
9. Refer to Drawing SO10-F3T4-DR005. Adhere the small template required to enlarge the hole in the top of the inner hat assembly. Using the cutting snips enlarge the hole to the size as indicated. Remove any remaining portion of the template from the top of the inner hat assembly.

10. Make certain there aren't any sharp edges or burrs on the surfaces of the holes that were cut or enlarged. Use an aluminum rasp to smooth edges. Remove metal particles with air blower or by gently tapping inner hat.

11. With a knife or other appropriate tool scrape the painted holes of the sensor plate, supplied with kit, to assure a good ground. Install the Rotron fan furnished in the mod kit on the sensor plate as shown in Drawing SO10-F3T4. Secure the fan with the cleats, screws and washers as shown. (Note that airflow direction arrow conforms to Drawing SO10-F3T4. Arrow direction is on fan.)

12. Insert the loose end of the power cord in one of the outer holes on the bottom plate of the inner hat assembly. Be sure that it is near the screw hole provided for the cable clamp.

13. Connect the ring lug provided in the mod kit to the green wire on the power cable. Carefully remove lugs provided with Rotron fan. Spaghetti both ends of C1, (.5 uf capacitor). Join one end of capacitor and white lead of power cable to one of these lugs. Crimp and solder. Connect the black lead of the power cable to removed fan lug. Crimp and solder. Connect the other end of capacitor to a fan lug. Crimp and solder. Connect the capacitor and power cable to the fan terminals as shown in Drawing SO10-F3T4 wiring diagram.

14. Pot the terminal strip on the fan and the capacitor with the silastic RTV 732 provided.

15. Reassemble the inner hat assembly to the outer hat assembly. Be sure there is no strain or pressure pulling on the silicone sensor cable during assembly. Pull both cables through the outer hat and pipe mounting plate holes.

16. Slip the baffle ring in place over the silicone sensor cable of the temperature transducer housing, place the rotron fan mounted sensor plate on top of the temperature transducer housing, align the three mounting holes and secure it all to the bottom of the inner hat assembly. Refer to Drawing SO10-F3T4. Make certain the power cord and the silicone sensor cable are in the proper position to be secured to the inner hat bottom plate. Secure these cables with the cable clamp.

17. Now that the Temperature Sensor Assembly is all assembled again, place it upside down so it is resting on the pipe mounting plate. That is, the Temperature Transducer is pointing upward,

18. Remove one screw securing the plate cover of the transducer housing and swing the plate cover to gain access to the transducer.



19. Install set screw into Thermal Mass and then install thermal mass. (See Drawing S010-F3T4), over the transducer and secure with long, metric hex wrench. Replace the plate cover partially removed in Step 18.
20. Reinstall the Temperature Sensor Assembly to the RAMOS Tower reversing the procedure as outlined in Step 4.
21. Run the power cable for the fan along with the Temperature Cable and reverse procedure as outlined in Steps 1 thru 3.
22. The power cable has 3 wires, green, white, and black. Before stripping the wires, lay the cable out. The green wire goes to chassis ground (use the upper-left screw on the Battery Equalizer Assembly). The white and black wires go to the 115V AC input terminals of the Power Supply S010-1PS1.
23. Cut the power cable to size. Strip back 1/2" from each wire, Connect a ring lug to each wire and crimp.
24. TURN OFF the AC power. This can be done by turning the AC breakers to OFF at the Commercial Power Box on the RAMOS Tower.
25. Connect the black wire and the white wire of the Power Cable to the AC input of the power supply. They will now be in parallel with the input leads coming from the Commercial Power Box. Connect the green wire to the upper-left screw of the Battery Equalizer Assembly.
26. Restore power by turning the breaker to the ON position. Be sure the Aspirator fan is operating.

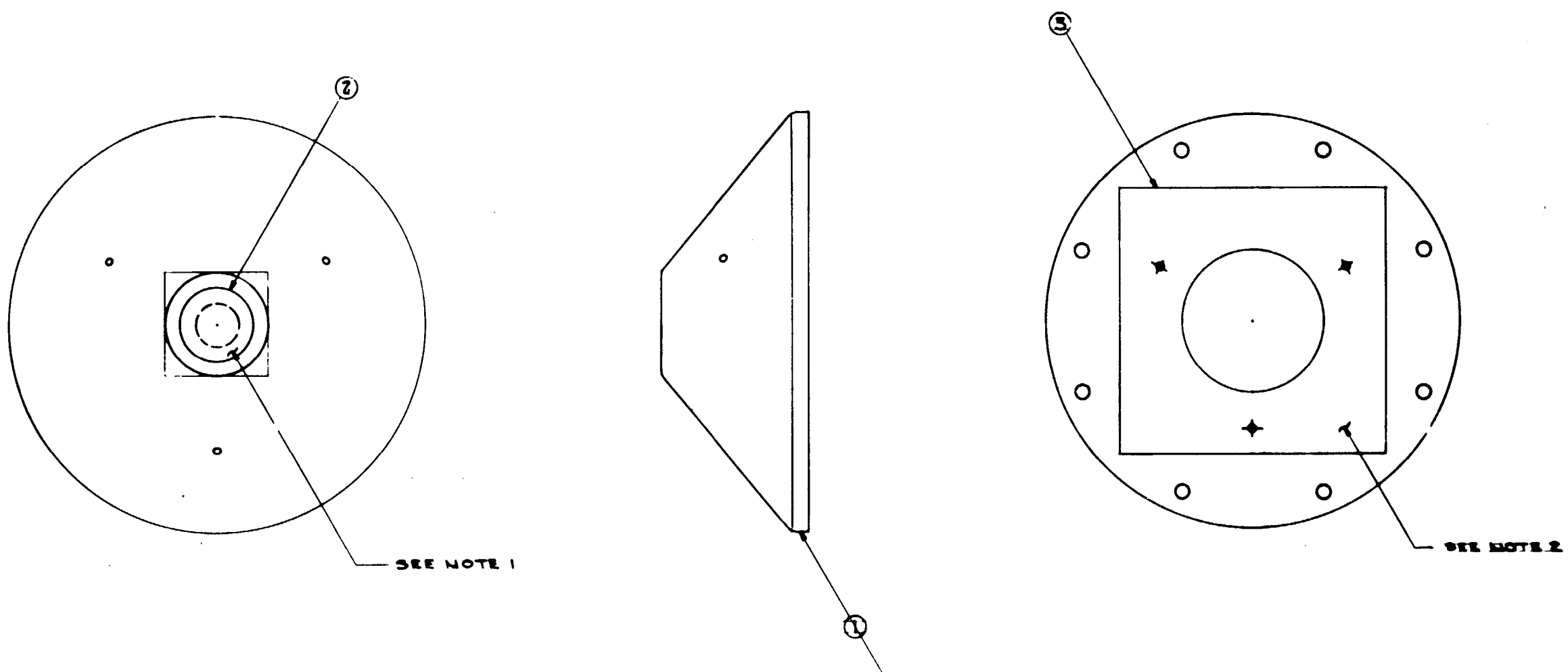
This completes the modification.

#### Manual Changes:

Add the following to Pages 2-277, 2-278, 2-279: Refer to Engineering Handbook No. 11, Section 3.3, Mod 3, Temperature Sensor Aspiration.

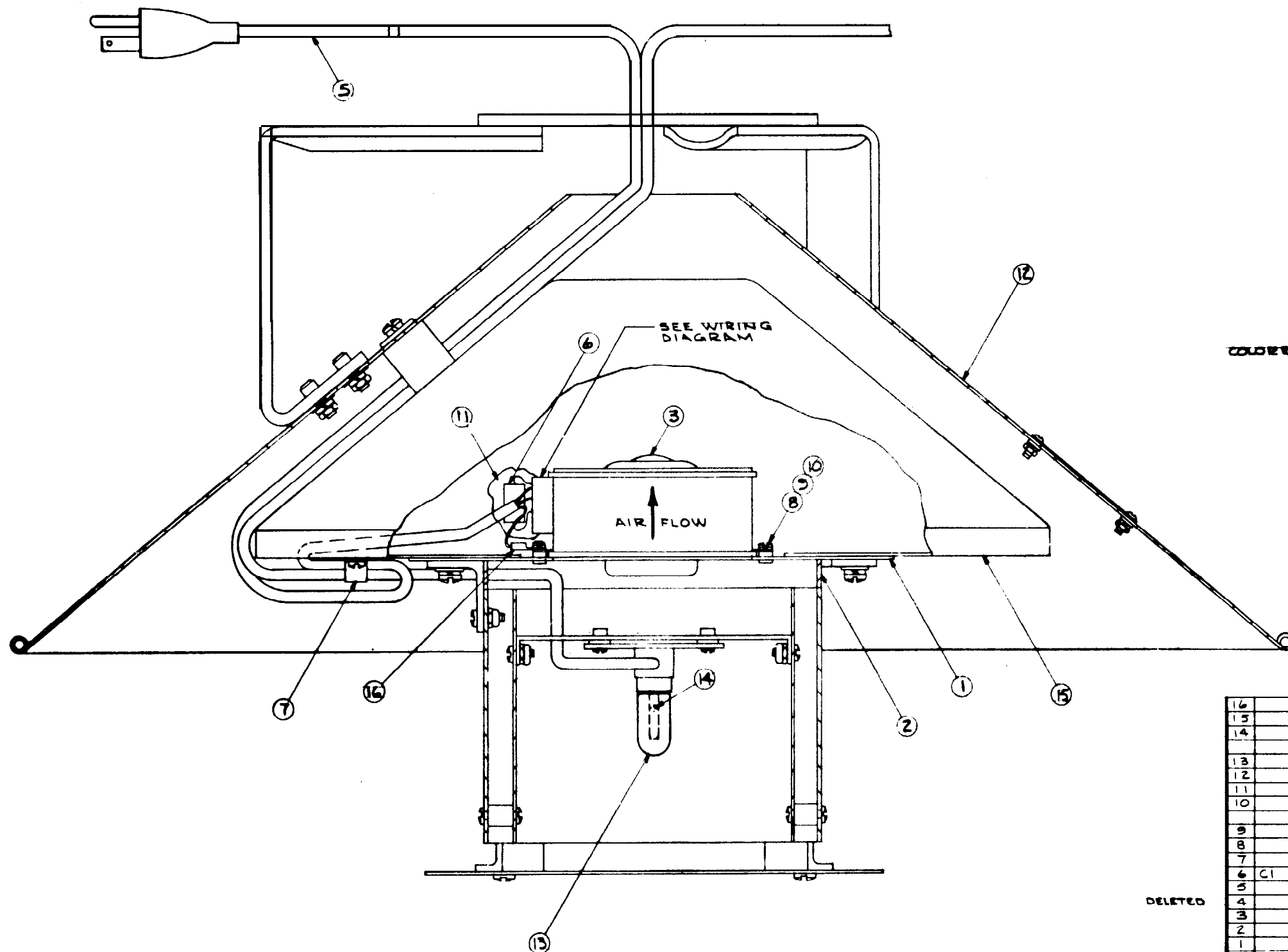
Attachments: 2 Drawings  
1 Reporting Equipment Modification Form H-28 (Instructions)

REVISION		
No.	Description	By

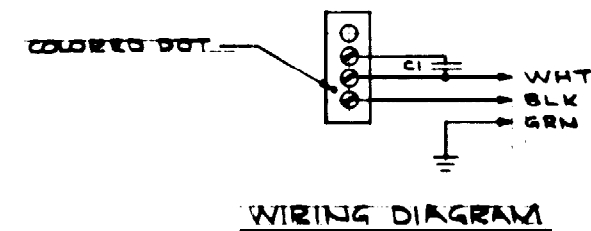


- NOTES:**
1. FIND NO. 2 SHALL BE ADHERED TO THE SURFACE OF FIND NO. 1 WITH THE DASHED DIAMETER ALIGNED OVER THE EXISTING 1.50 DIAMETER HOLE. THE NEW DIAMETER INDICATED BY THE SOLID DIAMETER ON FIND NO. 2 SHALL BE REMOVED FROM FIND NO. 1 USING CUTTING SLIPS NO. 4-7 MANUFACTURED BY WISS & SONS.
  2. FIND NO. 3 SHALL BE ADHERED TO THE SURFACE OF FIND NO. 1 WITH THE CROSS HAIRS CENTERED OVER THE EXISTING MOUNTING HOLES. THE DIAMETER INDICATED ON FIND NO. 2 SHALL BE REMOVED FROM FIND NO. 1 USING CUTTING SLIPS NO. 4-7 MANUFACTURED BY WISS & SONS.

3	BOTTOM TEMPLATE	1	5010-F3T4-DR004	D	DASH 2		
2	TOP TEMPLATE	1	5010-F3T4-DR004	D	DASH 1		
1	INNER HAT	1	5010-F3T1-DR013	D			
ITEM NO.	ELEC REF	DESCRIPTION	QTY REQD	PART OR IDENTIFYING NO.	SIZE	CORE	SPECIFICATION OR MATERIAL
LIST OF MATERIAL							
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: ANGLES ± 5° 3 PLACE DECIMALS ± .005 2 PLACE DECIMALS ± .01		EQUIPMENT DEVELOPMENT LABORATORY SILVER SPRING, MD. 20910 DATE 8/24/78		U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION NATIONAL WEATHER SERVICE			
		PREPARED	KOVARCH	EDL	<b>RAMOS-AMOS-HO63</b> <b>ASPIRATED TEMPERATURE(T)</b> <b>SENSOR</b> <b>TEMPLATE APPLICATIONS</b>		
		CHECKED		EDL			
		DESIGNED	KOVARCH	EDL			
		APPROVED BY		EDL			
		APPROVED BY		EDL	DRAWING NO. <b>5010-F3T4-DR005</b>		
		SCALE			SHEET 1 OF 1		



REVISION				
No.	Description	By	Date	Appr.
1	OMITTED FIND NO. 4 (AC. PLUG) EXCHANGED FIND NO. 5 FROM 83598 TO 17409	LA	8-12	



16		RING TERMINAL	1	4801		83330	
15		TEMPLATE APPLICATIONS	1	SO10-FST4-DR005			
14		SET SCREW, HEX, CRES	1	M33Z-5		0041	
		M3 X 0.5,					
13		THERMAL MASS	1	SO10-FST4-DR005			
12		TEMPERATURE ASSY	1	SO10-FST1			
11		SILASTIC RTV	AR	73Z		7/1984	SEE NOTE 1
10		SCREW, BIND HD, CRES	3				
		NO. 4-40UNC-2A, .38 LG					
9		WASHER, LOCK, NO. 4	3				
8		MOTOR MOUNT CLEAT	3	LZ-2		00141	
7		CLAMP	1	5/16-6		25267	
6	C1	CAPACITOR, .5 $\mu$ F, 100V, 10%	1	CK16BR474K		3.453	
5		CABLE WITH PLUG	1	17409		70505	
4							
3		FAN	1	387632H		82877	
2		BAFFLE RING	1	SO10-FST4-DR002	C		
1		PLATE	1	SO10-FST4-DR001	D		
FIND NO	ELEC REF DES	NOMENCLATURE OR DESCRIPTION	QTY REQD	PART OR IDENTIFYING NO	DWG SIZE	CODE IDENT	SPECIFICATION OR MATERIAL

# LIST OF MATERIAL

UNLESS OTHERWISE SPECIFIED  
DIMENSIONS ARE IN INCHES  
TOLERANCES: ANGLES ± .5°  
3 PLACE DECIMALS ± .005  
8 PLACE DECIMALS ± .001

EQUIPMENT DEVELOPMENT  
LABORATORY  
SILVER SPRING, MD. 20910  
DATE 8/24/78

U.S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION  
NATIONAL WEATHER SERVICE



PREPARED BY KOVARCH EDL  
CHECKED BY EDL  
DESIGN BY EDL  
APPROVED BY EDL  
APPROVED BY EDL

RAMOS-AMOS-H063  
ASPIRATED TEMPERATURE(T)  
SENSOR  
ASSEMBLY

SIZE D  
DRAWING NO. SO10-F3T4  
SCALE SHEET 1 OF 1 FILE



**UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration**

NATIONAL WEATHER SERVICE  
Silver Spring, Md 20910

October 5, 1982

OA/W5141 - TEC

TO: All NWS Regional Headquarters, Area Electronics Supervisors,  
and Electronics Technicians (EHB-11 Distribution)

FROM: OA/W51 - J. Michael St. Clair

SUBJECT: Transmittal Memorandum for Engineering Handbook No. 11,  
Issuance No. 82-5

1. Material Transmitted:

Engineering Handbook No. 11 - Automatic Observing Equipment, Section  
3.3 Modification No. 4: Viking Connectors for Dewpoint Probe Cable.

2. Summary:

This modification is due to changes in manufacturing procedures, and  
the decision to make the dewpoint probe a repairable stock item.

3. Effect on Other Instructions:

None.

4. Reporting Equipment Modifications:

Target date for reporting completion of this modification is  
December 1, 1982.

All completed equipment modifications shall be reported on the H-28  
Engineering Progress Report in accordance with EHB-4, Part 2.

5. Certification Statement:

This modification has been successfully field tested for system  
operational integrity.

EHB-11  
Issuance No. 82- 5



Engineering Division  
OA/W514

RAMOS MODIFICATION No. 4  
(For Electronics Technicians)

SUBJECT : Viking Connectors for the Dewpoint Probe Cable

PURPOSE : The Modification makes YSI Dewpoint Probe No. 15210 (Removable Bobbin) Compatible with the YSI Dewpoint Probe No. 1-17738 (Permanent Bobbin)

EQUIPMENT AFFECTED : All RAMOS Sites

PARTS REQUIRED : 1 each Viking Connector VR7/4RS15  
1 each Viking Connector VP7/4RP15

TOOLS REQUIRED : Standard Complement

TIME REQUIRED : 3 Work hours

MOD PROCUREMENT : This modification will be issued upon receipt of NOAA Form 37-4 at Engineering Division, W5141, 8060 13th Street, Silver Spring, Md. 20910, ATTN: Surface Project Leader, If more than one Mod Kit is requested, the Location and Organization Code of each must be stated on the 37-4 Form,

General: - This modification will update the dewpoint probe cable to accept the dewpoint probe. It will also enable the technician to remove the dewpoint probe for cleaning or replacement with less effort.

PROCEDURE:

1. Remove the dewpoint probe cable assembly from the system and return to work bench area. Cover and protect both the dewpoint probe, bobbin and the pins of the Viking Connector to prevent damage.
2. Measure 7 inches from the bottom end of the probe assembly and cut the cable.
3. Strip and prepare both sides of the cable for soldering into the Viking Connectors.
4. Use the male connector Viking No. VP7/4RP15 for the dewpoint probe assembly connections.
5. Use the female connector Viking No. VR7/4RS15 as the termination on the long cable.

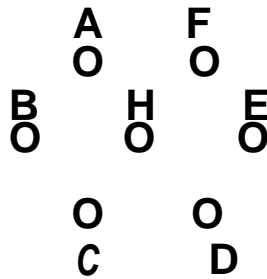
6. Connect the cable as shown in Figure 1. It is recommended that the technician work on the long cable first to prevent an irreversible error on the probe end.
7. After testing continuity of the cable, screw the cover on the connectors.
8. Clean and recharge the dewcell bobbin and reinstall at the site prior to turning system on.
9. Check system calibration. Recalibrate if necessary.
10. Spare dewcell probe: Remove connector, cut cable as in Step 2, and attach as shown in Figure 1.

This completes the modification.

NOTE: The dewpoint probe is now a repairable item and should be sent to NRC for repairs as required.

Attachments:

Figure 1 - 1 each  
Form H-28 - 1 each.



**WIRE ORDER FOR BOTH CONNECTORS**

**A. NO CONNECTION**

**B. RED WIRE**

**C. GREEN WIRE**

**D. BLACK WIRE**

**E. WHITE WIRE**

**F. NO CONNECTION**

**H. SHIELD**

**FIGURE I**



**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
NATIONAL WEATHER SERVICE  
Silver Spring, Md. 20910

W/OTS141 - TEC

TO: All NWS Regional Headquarters, Area Electronics Supervisors,  
and Electronics Technicians (EHB-11 Distribution)

FROM: W/OTS1- J. Michael St. Clair

SUBJECT: Transmittal Memorandum for Engineering Handbook No. 11, Issuance 84-

1. Material Transmitted:

Engineering Handbook No. 11 - Automatic Observing Equipment, Section 3.3,  
Modification Note 5: Installation and Programming Instructions for the  
Handar 540A Data Collection Platform (DCPH).

2. Summary:

This modification updates RAMOS/S sites by replacing the Magnavox and  
LaBarge Data Collection Platforms (DCPH) with a microprocessor controlled  
programmable Handar 540A DCPH.

3. Effect on Other Instructions:

Maintenance Note No. 3, Section 2.3 of EHB-11 Issuance bad and should be  
removed

4. Certification Statement:

This modification has been successfully field tested for system  
operational integrity.

5. Reporting Modification to WSH Engineering Division:

Target date for reporting completion of this modification is

All completed equipment modifications shall be reported on the H-28 Form,  
Engineering Progress Report in accordance with EHB-4, Part 2.

EHB-11  
Issuance 84-





RAMOS MODIFICATION NOTE 5  
(for Electronics Technicians)

SUBJECT : Installation and Programming Instructions for the Handar 540A Data Collection Platform (DCPH)

PURPOSE : To replace the Magnavox DCPH and the LaBarge DCPH with the programmable Handar 540A DCPH

EQUIPMENT AFFECTED : All Magnavox and LaBarge DCPH's at RAMOS/S sites

PARTS REQUIRED : 1 ea. Handar 540A DCPH, with manual  
1 ea. Handar 545A programming set  
4 ea. Screws, head cap, 3/8 x 1 inch  
2 ea. Power cables (D900-5W2)  
1 ea. Signal cable (D105-1W1)  
4 ea. Washer, lock, 3/8 inch  
4 ea. Washer, flat, 3/8 inch  
4 ea. Nut, clamping 3/8 x 3 inch

TIME REQUIRED : 6 Work hours

MOD PROCUREMENT : All parts required to complete this modification have been shipped directly to all affected stations.

SPECIAL TOOLS : None  
REQUIRED

SPECIAL TEST : Dual Power Supply such as the Trigon Dual Lab  
EQUIPMENT Supply Model DL 40-1 (necessary to charge the batteries in Handar 540A prior to installation).  
Magnetic compass.  
Clinometer (or other means of checking elevation angle).

General:

This replacement Data Collection Platform (DCPH) was necessitated by the decision to change GOES satellite frequency assignments. Multi-channel capability is provided in a programmable, microprocessor controlled device -- the Handar DCPH Model 540A.

I. MAGNAVOX AND LaBARGE DATA COLLECTION PLATFORM (DCPH) REPLACEMENT.

Parts II and III should be accomplished in completing this modification.

- A. Programming Items A, B, and C should be accomplished in completing the programming.

The HANDAR 540A DCPH may be programmed with the 545A programming set either in your office before installation at the field site (recommended) or at the field site. If you are using HANDAR in your office before installation (for programming, training, etc.), a dual +12V power supply should be connected to the 540A external connectors marked EXT DC IN and Solar Panel/Batt Chg. There is no problem with the 545A programming set as it has its own external power supply. Familiarity with the HANDAR Manual is desirable. It is recommended that the following sections in the Handar manual be read before proceeding to program the DCPH:

- 1.1 Introduction (p. 1)
- 1.1.1 The 540/545A Data Acquisition System (p. 1)
- 3.0 PROGRAMMING (p. 40)
- 3.1 Programming the 540A System (p. 40)
- 3.2 Initial Connection (p. 42)
- 3.3 Control Keys (p. 43)
  - 3.3.1 RUN (p. 43)
  - 3.3.2 PROG (pp. 43-44)
  - 3.3.3 SAVE (p. 44)
  - 3.3.4 LOAD (p. 44)
  - 3.3.5 SCROLL UP (p. 44)
  - 3.3.6 SCROLL DOWN (p. 44)
  - 3.3.9 NXMIT (p. 45)
  - 3.3.10 NSCAN (p. 45)
- 3.5.1 ID (p. 46)
- 3.5.2 TIME (p. 46)
- 3.5.3 XMIT (pp. 46-49)
- 3.5.5 CH # (p. 53)
- 3.5.6 MEAS (p. 53)
- 3.6.15 SYNCHRONOUS SERIAL DATA INTERFACE (pp.65-66)
- 7.2 Setting the Time (pp. 93-94)

Familiarity with the 545A programming set keyboard will also aid the technician.

Be certain that the programmer and all batteries for Handar are fully charged or the program will not transfer to the DCPH.

- B. Open the door of the HANDAR 540A DCPH. Set the assigned channel using the CHAN 1 switches on the 540-6004 assembly mounted on the

door. The assigned channel (044 or 061) is listed in Table 1. Set CHAN 2 switches to 000.

1. Turn on power. The power toggle switch is located in the enclosure near the middle of the door hinge. Unless installation will be delayed several days, you may close and secure the door at this time.

C. Programming Procedure:

The following steps of this procedure will list your action, followed by the HANDAR prompt in quotes. Where a lower case x is used within the quotes, it means a random or preset digit will be displayed. Where a lower case y is used within the quotes, it means a digit just entered will be displayed. HANDAR Manual references are enclosed in parentheses.

1. Enter the time and date into the HANDAR 545A PROGRAMMING SET as follows:
  - a. Press POWER. "N HANDAR PROGRAMMING SET 545A REV A.0".
  - b. Press TIME. "N GMT TIME xx:xx:xx". Enter Greenwich Mean Time, hours and minutes only. Press ENTER to enter the data and start the clock at 00 seconds. The CLEAR key (3.4.1, p. 45) may be used to correct an entry, or press the TIME key again to make a new entry.
  - c. Press SCROLL UP (indicated by dark triangle) (3.3.5, p. 44). "N MONTH/DAY/YEAR xx/xx/xx". Enter date. End this and all other entries by pressing the ENTER key (3.5.1, p. 46). "N MONTH/DAY/YEAR yy/yy/yy", where the y's are your entered date.
  - d. Press POWER and display will go blank. Connect the PROGRAMMING SET to the DCPH jack marked PROG/IO. "P HANDAR 540A DCPH REV 2.6" shown momentarily, then "SYSTEM PROG REQUIRED - PRESS ID". If the display does not indicate properly turn the POWER SWITCH (located in the 540A Box) OFF then back ON.
  - e. Press ID. "P ID 00000000". Enter DCPH Address found in Table 1. "P ID yyyyyyyy", where the y's are your entered address (3.4.2, p. 45).

- f. Press TIME. "P STATION TIME x x:x x:x x". Press SCROLL UP. "P DIFF TIME- (DCPH or PS) LEAD xx:xx:xx.". Press 0, then Enter. "ENTER DIFF TIME LEAD:1-DCPH 2=PS". Press 1, then press Enter. "P DIFF TIME-DCPH LEAD 00:00:00". Can be 00 or 01
- g. Press XMIT. "P GOES PRI XMT MODE 00". Press 1, then press Enter. "P GOES PRI XMT MODE 01".
- h. Press SCROLL DOWN indicated by dark triangle (3.3.6, p.44). "P 1ST GOES XMT TIME 00:00:00". Table 1 contains the time slot assignment for your DCPH in minutes after the hour. Enter the GMT time in hours and minutes for the first transmission after completion of installation (3.5.3, pp. 46-49). This time may need to be updated just prior completion of installation. Record time for Step "P. "P 1ST GOES XMT TIME yy:yy:00".
- i. Press SCROLL DOWN. "P PRI XMT INTERVAL 00:00:00". Press 01, then press Enter. "P PRI XMT INTERVAL 01:00:00".
- j. Press SCROLL DOWN. "P GOES SEC XMT MODE 00" (if not 00, enter 0).
- k. Press CH#. "P CHANNEL NO. 00". Press 1, then press Enter. "P CHANNEL NO. 01" (3.5.5, p. 53).
- l. Press MEAS. "PO1 SENSOR TYPE 00". Press 15, then press Enter. "PO1 SENSOR TYPE 15" (3.5.6, p. 53).
- m. Press SCROLL DOWN. "PO1 MAX # OF CHARS 000". Press 40, then press Enter. "PO1 MAX # OF CHARS 040" (3.6.15, pp. 65-66).
- n. Press SCROLL DOWN. "PO1 MODE? (1, 2, 3) 01". Press 3, then press Enter. "PO1 MODE? (1, 2, 3) 03".
- o. Press SCROLL DOWN. "PO1 MEAS INTERVAL 00:00:00". Press 01, then press Enter. "CHANGE ALL CHANS? (1=Y, 2=N)". Press 1, then press Enter. "PO1 MEAS INTERVAL 01:00:00".
- p. Press SCROLL DOWN. "PO1 START OF MEAS 00:00:00". Enter time 2 minutes before time entered in step j. This time may need to be updated just prior to completion of installation. To accomplish this update (time) refer back

- to Step i and repeat the steps through P again. "CHANGE ALL CHANS? (1=Y, 2=N)". Press 1 then press Enter. "PO1 START OF MEAS yy:yy:00".
- q. Press SAVE (3.3.3, p. 44). This will save this program in the PROGRAMMING SET. "SAVE DCPH PROG PS:PRESS ENTER". Press ENTER. "P SAVING PROGRAM \*\*\*", "P DONE".
- r. To load program into DCPH press load. (3.3.4 P. 44). Then press ENTER. "DONE".
- s. If you are concluding the installation, press RUN and "R RUN/MONITOR MODE" will be displayed (3.3.1, p. 43).
- t. Disconnect the PROGRAMMING SET. (End of Procedure)

## Sample Program

ID	EACCCBB4 *
STATION TIME	12:34:56 *
YEAR	84 *
DCPH JULIAN DATE	263 *
GOES PRI XMT MODE	01
1ST GOES XMT TIME	13:24:00 *
PRI XMT INTERVAL	01:00:00
GOES SEC XMT MODE	00
CHANNEL NO.	01
01 SENSOR TYPE	15
01 MAX # OF CHARS	040
01 MODE? (1, 2, 3)	03
01 MEAS INTERVAL	01:00:00
01 START OF MEAS	13:22:00 *

\* Varies with time, date, and place of installation.

II. HANDAR 540A INSTALLATION

- A. Preparation: Handar 540A installation criteria, Items 1 through 7, should be checked prior to starting Part B of the modification.
- B. Installations. Be aware that not all RAMOS/S installations are the same due to siting considerations.
1. The cables supplied with this modification are about six feet long. You may have to accommodate location to this height or make new cables.
  2. The transmitter (RG8/U) (RG-214/U) type cable may need to be replaced. Inspect the cable for any damage.
  3. Check the antenna orientation. See Table One for details. A magnetic compass and a clinometer (or other means for measuring elevation angle) will be needed. Note the magnetic declination (variance) for the site.
  4. The support mounting hardware has been shipped from WSH. Check that you have 4 ea. 3/8" x 1" bolts, flat washers, split washers and spring loaded nuts.
  5. The mounting hardware should be on site - (The previous transmitter's hardware).
  6. When installing the Handar on the tower be sure to take up the Programmer Set, so you can check and complete the program and load it into the system.
  7. When you turn off the comms unit you do not disconnect the batteries. To remedy, remove the relay K301 until you have completed the hookup wiring. Then replace the relay.

III. INSTALLATION INSTRUCTIONS FOR THE HANDAR 540A DATA COLLECTION PLATFORM

- A. Procedure: Steps 1 through 10 should be accomplished in completing the installation. Reference should be made to Table 1 attached.
1. Turn power off using switch 1A2S201 in the RAMOS Basic Electronics Assembly (BEA). Open the Communications Assembly and remove relay K301.

2. Disconnect all cables from the Magnavox (or LaBarge) DCPH.
3. Dismount the Magnavox or LaBarge DCPH.
4. Detach and remove the signal and power cable where it attached to the RAMOS Communications Assembly, 3A4TB1.
5. Check and reorient the antenna if necessary. The azimuth and elevation angles are given in Table 1. Azimuth angles in Table 1 are true north: adjust for magnetic declinations, if using a compass! (Add easterly declination to magnetic to get true).
6. Mount the HANDAR 540A DCPH in the place vacated by the Magnavox or LaBarge DCPH. Make any adjustments in support rails for technician's convenience.
7. Install/attach antenna, power, and signal cables as follows:
  - a. Attach antenna coaxial cable to jack marked RF OUT.
  - b. Attach the two power cables (D900-5W2) to HANDAR jacks marked EXT DC IN and BATT CHG. Spade lug ends of both cables attach to RAMOS Communications Assembly 3A4TB1:
    - (1) Black wires = B = Ground = TB1-1.
    - (2) White wires = A = 13.5V = TB1-2.
  - c. Attach signal cable (D105-1W1) to HANDAR jack marked RAMOS. Spade lug ends attach to RAMOS Communications Assembly 3A4TB1:
    - (1) Shield wire = A = Ground = TB1-3.
    - (2) Black wire = E = Data = TB1-4.
    - (3) Green wire = B = Clock = TB1-5 (or TB1-9 for Local Readout Option).
    - (4) Red wire = D = End = TB1-6.
    - (5) White wire = C = Enable = TB1-7 (or TB1-8 for Local Readout Option).
  - d. Reinsert Relay K301 in the Communications Assembly.
8. Turn power on using switch 1A2S201 on RAMOS Battery Equalizer Assembly.
9. Turn power on in the HANDAR 540A DCPH, if not already on. Program or complete the programming at this time.

10. Pot the cables with RTV where they enter the RAMOS Communications Assembly enclosure per RAMOS Manual, Volume 1, p. 4-64.

(This completes the Modification)



IV. INSTRUCTION MANUAL CHANGES

Refer to the newly issued 540A Handar manual for all additional information. The replaced equipment LaBarge and Magnavox DCPH's manuals can be removed from the station manuals and stored with the replaced DCPH's.

A. Instruction Material: None.

B. Schematics and/or diagrams: None.

C. Parts List: The parts list will be found in the manufacturer's Handar 540A Manual supplied. Add the following items, by pen and ink, to the parts list:

Page 151 - Two power cables D900-5W2 connecting DCPH to RAMOS comms assembly.

Page 151 - Cable D105-1W1 connecting DCPH to RAMOS comms assembly.

Additional Attachments:

Table 1

Three illustrations of proposed mounting instructions.

Figure 1 - Tower

Figure 2 - Detail A "Mounting Location of DCPRS"

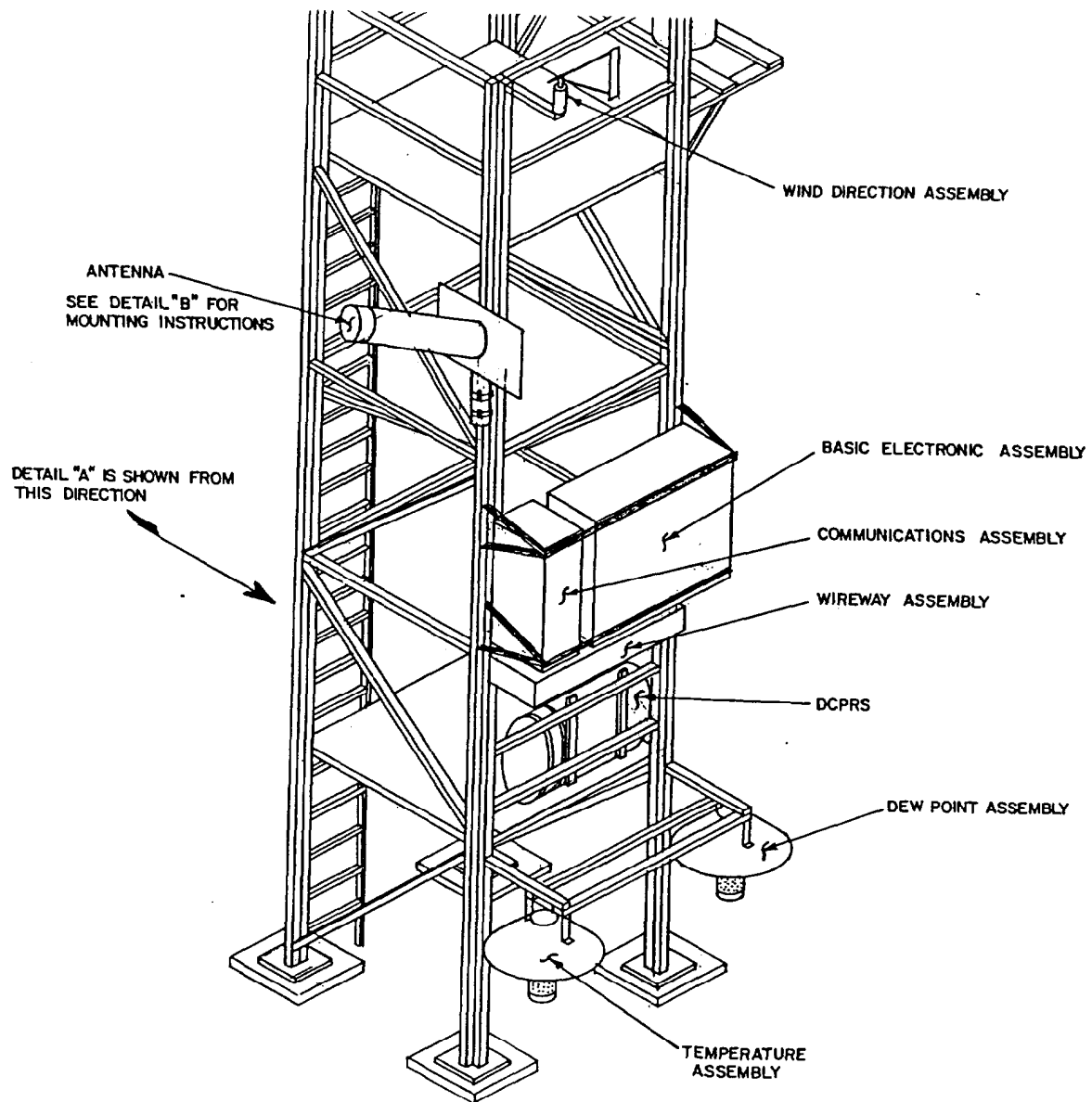
Figure 3 - Detail B "Antenna Mounting"

Reporting Instructions H-28

HANDAR 540A-RAMOS TABLE 1

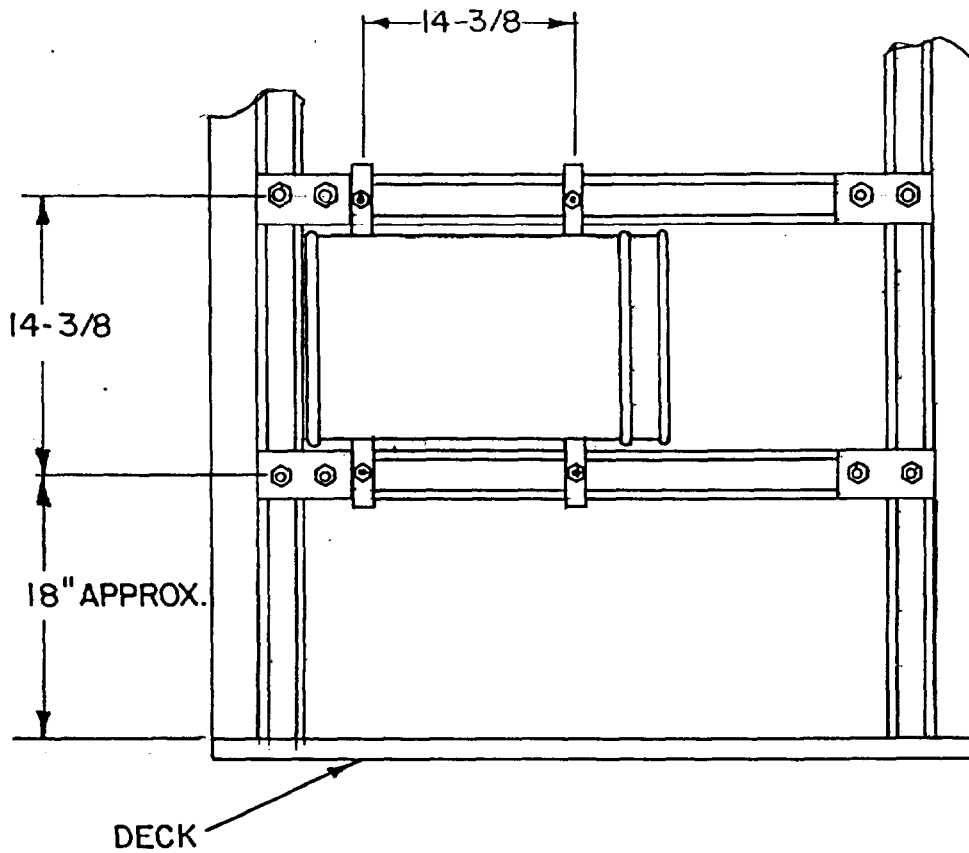
<u>Site</u>	<u>DCPH Address</u>	<u>Channel</u>	<u>Time</u>	<u>Elev</u>	<u>Azi m*</u>
Clayton Lake, ME	EACCCBB4	61E	24	33	207
Mt. Desert Rock, ME	15D0A3AC	61E	26	35	210
Clines Corner, NM	15CEA05A	61E	27	46	154
Salt Point, LA	15D0C64A	61E	28	56	177
Tenneco O. P., LA	15CFA2A0	61E	29	57	174
Lukeville, AZ	15CF24B4	44W	18	52	193
Rome, OR	15D025B8	44W	19	41	183
Anakturak Pass, AK	15CFB1D6	44W	20	10	146
Andreafski, AK	15CF844C	44W	21	11	133
Cape Decision, AK	15D56172	44W	22	25	163
Cape Spencer, AK	15D50494	44W	23	22	161
Eldred Rock, AK	15CF4152	44W	24	22	162
Nikolski, AK	15D01022	44W	25	15	125
Pt. Retreat, AK	15CE86B6	44W	26	22	163
Shungnak, AK	15D591F6	44W	27	13	140
French Frigate Shoals, HI	15D58280	44W	28	32	111

\* True bearings, adjust for magnetic deviation of compass!



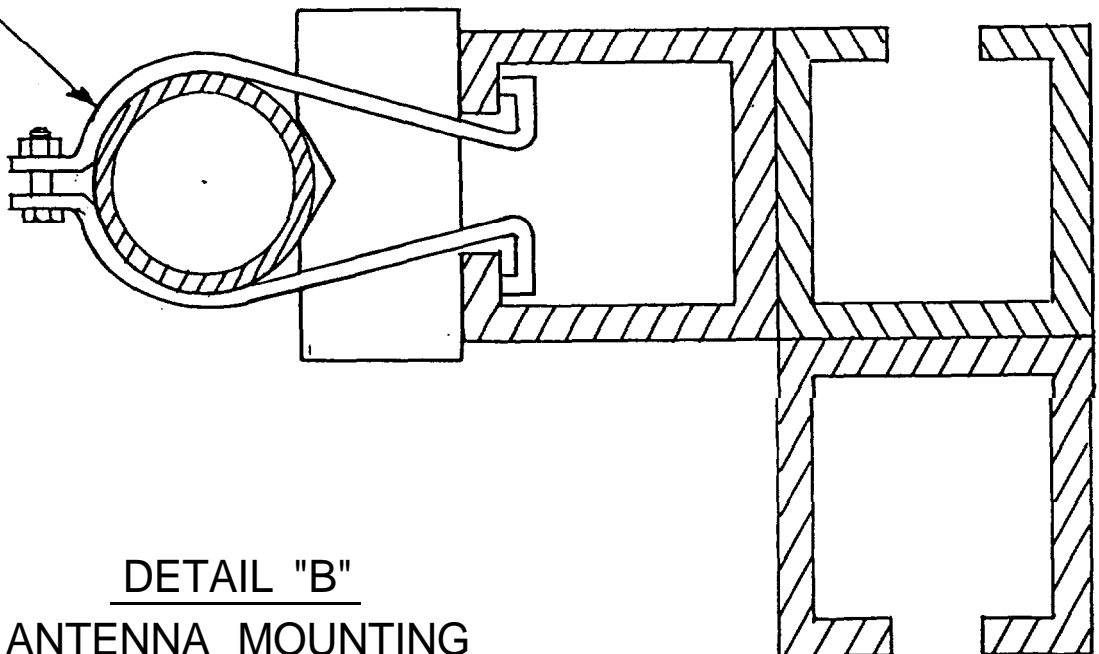
# REVISIONS

Zone	Ltr.	Description	Date	Rev. By	App'd.
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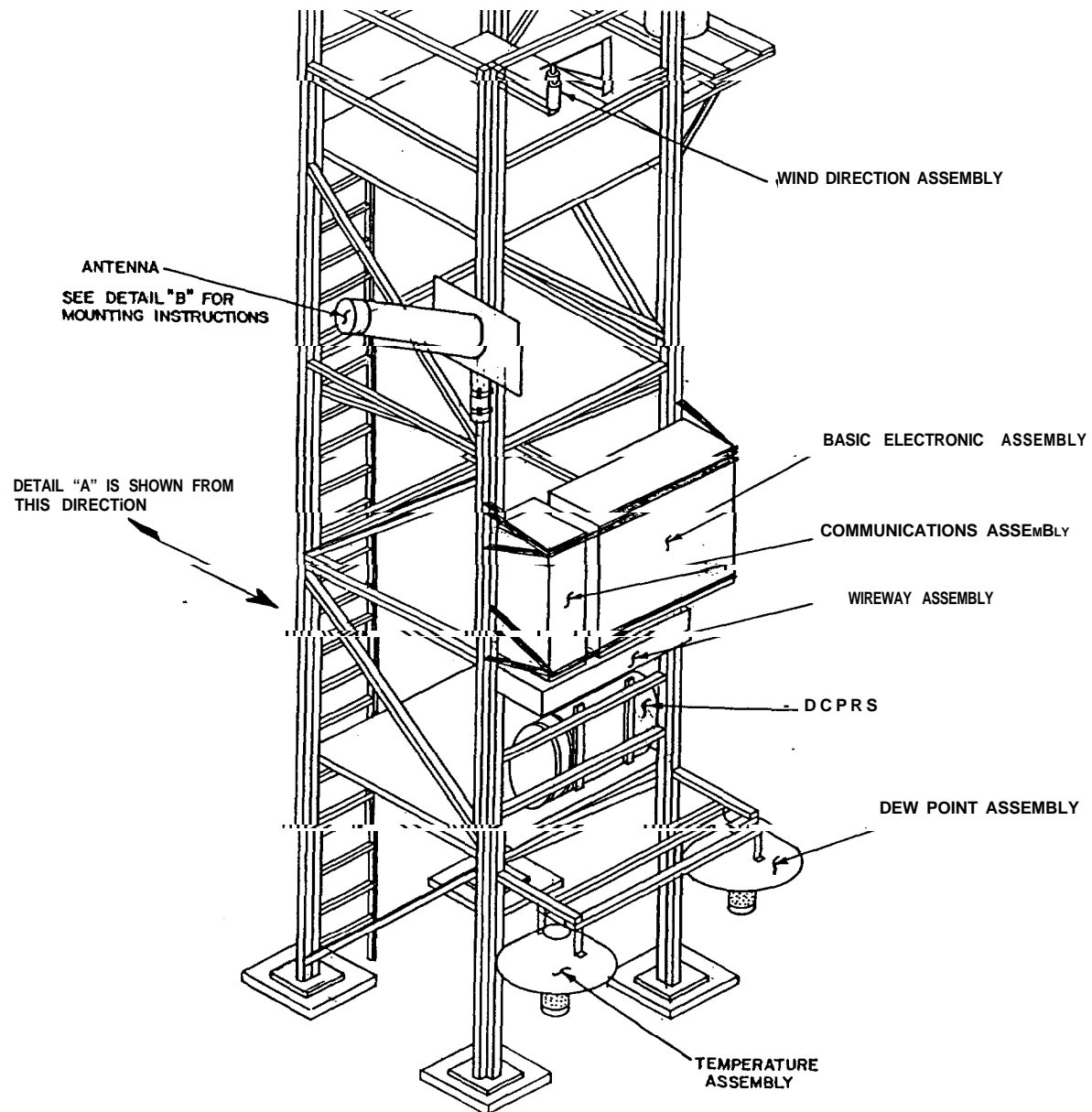


DETAIL "A" MOUNTING  
LOCATION OF DCPRS

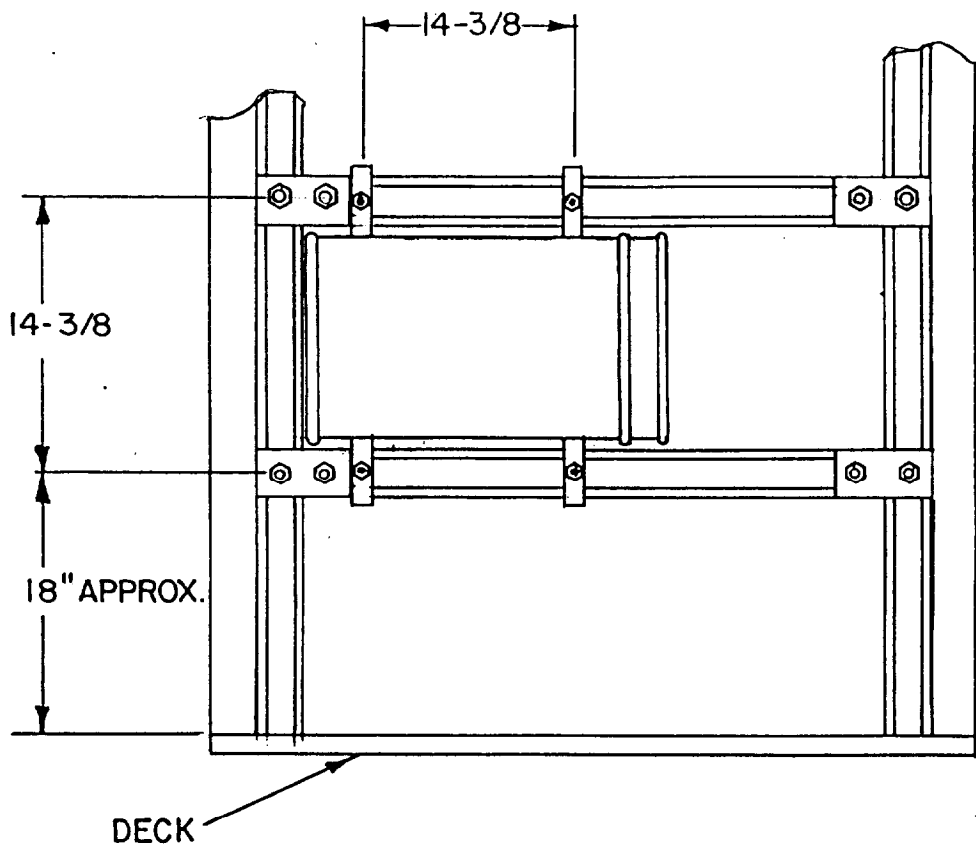
PI569 UNISTRUT PIPE CLAMP



DETAIL "B"  
ANTENNA MOUNTING



REVISIONS					
Zone	Ltr.	Description			Date
					Rev. By App'd.

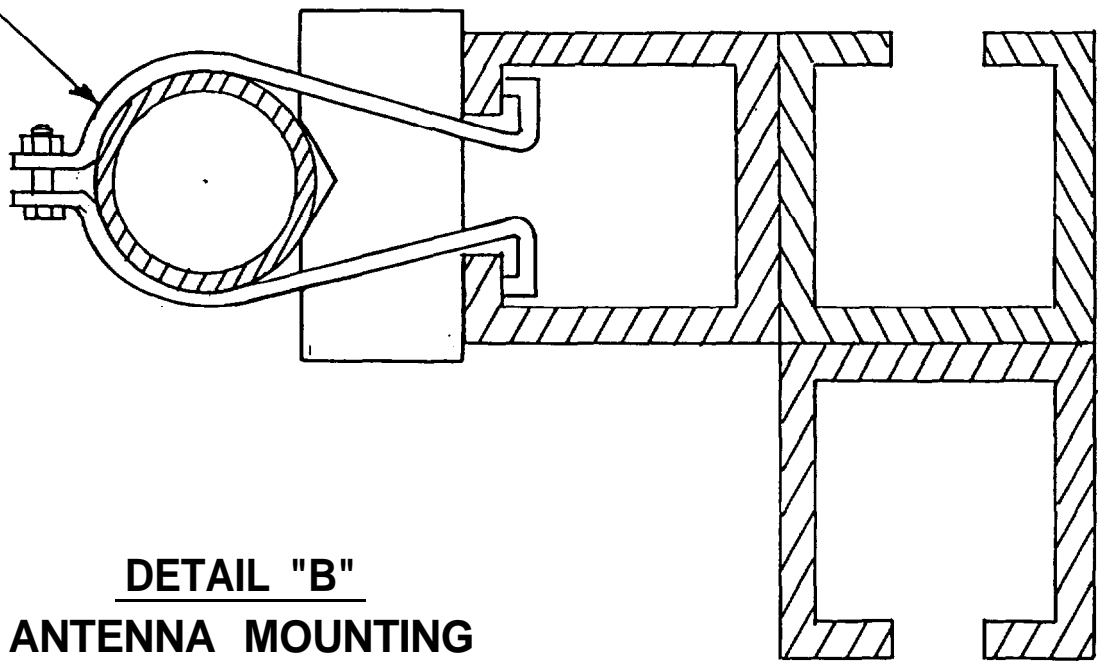


DETAIL "A" MOUNTING  
LOCATION OF DCPRS

01500



PI569 UNISTRUT PIPE CLAMP



DETAIL "B"  
ANTENNA MOUNTING



**U.S. DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
NATIONAL WEATHER SERVICE  
Silver Spring, Md. 20910

W/OS0321 - WDH

November 4, 1986

TO: All NWS Regional Headquarters, Area Electronics Supervisors, and  
Electronics Technicians (EHB-11 Distribution)

FROM: W/OS03 - J. Michael St. Clair *J. M. St. Clair*

SUBJECT: Transmittal Memorandum for Engineering Handbook No. 11, Issuance 86-6

1. Material Transmitted:

Engineering Handbook No. 11, Automatic Observing Equipment, Section 3.3,  
Errata Sheet No. 1 to RAMOS Modification Note 5.

2. Summary:

Errata Sheet No. 1 updates RAMOS Handar programming procedures by the  
addition of a step.

3. Effect on Other Instructions:

None.

EHB-11  
Issuance 86-6



ERRATA SHEET NO. 1 TO RAMOS MODIFICATION NOTE 5

The reference modification note was written when the HANDAR 540 program was 'version 2.8. Many HANDAR 540's now have program version 3.8. Version 3.8 has one additional program prompt not found in version 2.8. This prompt must be correctly responded to, or the system will not function as intended.

The additional prompt asks if the buffer should be erased after each transmission. The desired action is to erase the buffer. Not erasing the buffer causes the HANDAR 540 to transmit old data. (The 540 transmits the first RAMOS data received after the 540 was placed in the run mode.)

This revision will require two additions to the modification note. Replace pages 3, 4, and 5 in RAMOS Modification Note 5 with the attached upgraded pages.

door. The assigned channel (044 or 061) is listed in Table 1. Set CHAN 2 switches to 000.

1. Turn on power. The power toggle switch is located in the enclosure near the middle of the door hinge. Unless installation will be delayed several days, you may close and secure the door at this time.

C. Programming Procedure:

The following steps of this procedure will list your action, followed by the HANDAR prompt in quotes. Where a lower case x is used within the quotes, it means a random or preset digit will be displayed. Where a lower case y is used within the quotes, it means a digit just entered will be displayed. HANDAR Manual references are enclosed in parentheses.

1. Enter the time and date into the HANDAR 545A PROGRAMMING SET as follows:
  - a. Press POWER. "N HANDAR PROGRAMMING SET 545A REV A.0".
  - b. Press TIME. "N GMT TIME xx:xx:xx". Enter Greenwich Mean Time, hours and minutes only. Press ENTER to enter the data and start the clock at 00 seconds. The CLEAR key (3.4.1, p. 45) may be used to correct an entry, or press the TIME key again to make a new entry.
  - c. Press SCROLL UP (indicated by dark triangle) (3.3.5, p. 44). "N MONTH/DAY/YEAR xx/xx/xx". Enter date. End this and all other entries by pressing the ENTER key (3.5.1, p. 46). "N MONTH/DAY/YEAR yy/yy/yy", where the y's are your entered date.
  - d. Press POWER and display will go blank. Connect the PROGRAMMING SET to the DCPH jack marked PROG/IO. "P HANDAR 540A DCP REV X.X" shown momentarily, then "SYSTEM PROG REQUIRED - PRESS ID". If the display does not indicate, properly turn the POWER SWITCH (located in the 540A Box) OFF, then back ON.
  - e. Press ID. "P ID 00000000". Enter DCPH address found in Table 1. "P ID yyyyyyyy", where the y's are your entered address (3.4.2, p. 45).

- f. Press TIME. "P STATION TIME xx:xx:xx". Press SCROLL UP. "P DIFF TIME- (DCP or PS) LEAD xx:xx:xx". Press 0, then Enter. "ENTER DIFF TIME LEAD:1-DCP 2=PS". Press 1, then press Enter. "P DIFF TIME-DCP LEAD 00:00:00". Can be 00 or 01
- g. Press XMIT. "P GOES PRI XMT MODE 00". Press 1, then press Enter. "P GOES PRI XMT MODE 01".
- h. Press SCROLL DOWN indicated by dark triangle (3.3.6, p.44). "P 1ST GOES XMT TIME 00:00:00". Table 1 contains the time slot assignment for your DCPH in minutes after the hour. Enter the GMT time in hours and minutes for the first transmission after completion of installation (3.5.3, pp. 46-49). This time may need to be updated just prior to completion of installation. Record time for Step q. "P 1ST GOES XMT TIME yy:yy:00".
- i. Press SCROLL DOWN. "P PRI XMT INTERVAL 00:00:00". Press 01, then press Enter. "P PRI XMT INTERVAL 01:00:00".
- j. Press SCROLL DOWN. "P GOES SEC XMT MODE 00" (if not 00, enter 0).
- k. Press CH#. "P CHANNEL NO. 00". Press 1, then press Enter. "P CHANNEL NO. 01" (3.5.5, p. 53).
- l. Press MEAS. "PO1 SENSOR TYPE 00". Press 15, then press Enter. "PO1 SENSOR TYPE 15" (3.5.6, p. 53).
- m. Press SCROLL DOWN. "PO1 MAX # OF CHARS 000". Press 40, then press Enter. "PO1 MAX # OF CHARS 040" (3.6.15, pp. 65-66).
- n. Press SCROLL DOWN. "PO1 MODE? (1, 2, 3) 01". Press 3, then press Enter. "PO1 MODE? (1, 2, 3) 03".  
  
(If you have version 2.8, skip Step o and proceed to Step p.)
- o. Press SCROLL DOWN. "PO1 AUTO DEL? 1=Y O=N 00". Press 1, then press Enter. "PO1 AUTO DEL? 1=Y O=N 01".
- p. Press SCROLL DOWN. "PO1 MEAS INTERVAL 00:00:00". Press 01, then press Enter. "CHANGE ALL CHANS? (1=Y, 2=N)". Press 1, then press Enter. "PO1 MEAS INTERVAL 01:00:00".
- q. Press SCROLL DOWN. "PO1 START OF MEAS 00:00:00". Enter time 2 minutes before time entered in Step h. This time may need to be updated just prior to completion of installation. To accomplish this update (time) refer back to Step g and repeat the steps through q again. "CHANGE ALL CHANS? (1=Y, 2=N)". Press 1, then press Enter. "PO1 START OF MEAS yy:yy:00".

- r. Press SAVE (3.3.3, p. 44). This will save this program in the PROGRAMMING SET. "SAVE DCP PROG PS:PRESS ENTER". Press ENTER. "P SAVING PROGRAM \*\*\*", "P DONE".
- S. To load program into DCPH press load. (3.3.4 P. 44). Then press ENTER. "DONE".
- t. If you are concluding the installation, press RUN and "R RUN/MONITOR MODE" will be displayed (3.3.1, p. 43).
- U. Disconnect the PROGRAMMING SET. (End of Procedure)

## Sample Program

ID	EACCCBB4 *
STATION TIME	12:34:56 *
YEAR	84 *
DCPH JULIAN DATE	263
GOES PRI XMT MODE	01
1ST GOES XMT TIME	13:24:00 *
PRI XMT INTERVAL	01:00:00
GOES SEC XMT MODE	00
CHANNEL NO.	0 1
01 SENSOR TYPE	15
01 MAX # OF CHARS	040
01 MODE? (1, 2, 3)	03 **
AUTO DEL? 1=Y 0=N	01
01 MEAS INTERVAL	01 01:00:00
01 START OF MEAS	13:22:00 *

\* Varies with time, date, and place of installation.

\*\* Version 2.8 programs do not contain this line.



**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
NATIONAL WEATHER SERVICE  
Silver Spring, Md. 20910

June 1, 1984

W/OTS141 - WDH

TO: All NWS Regional Headquarters, Area Electronics Supervisors,  
and Electronics Technicians (EHB-11 Distribution)

FROM: W/OTS1 - J. Michael St. Clair

SUBJECT: Transmittal Memorandum for Engineering Handbook No. 11, Issuance 84- 3

1. Material Transmitted:

Engineering Handbook No. 11, Automatic Meteorological Observing Equipment,  
Section 3.3 RAMOS, Modification Note 6: Installation of Direct Connect  
Coupler (DCC) (MM110).

2. Summary:

Modification Note 6 provides instructions for installing the Direct  
Connect Coupler into the RAMOS/T.

3. Effect on Other Instructions:

Page changes to RAMOS Manual are included.

4. Certification Statement:

The DCC has been tested by the Test and Evaluation Division at Sterling,  
Virginia, and at selected field sites for operational integrity.

5. Reporting Modification to WSH Engineering Division:

Target date for completion of this modification is June 29, 1984.

All completed equipment modifications shall be reported as instructed in  
EHB-4 part 2 (Engineering Progress Report, WS Form H-28) within 28 days of  
completion.

EHB-11  
Issuance 84- 3



RAMOS MODIFICATION NOTE 6  
DIRECT CONNECT COUPLER (DCC) (MM110)  
(for Electronics Technicians)

SUBJECT : Installation Instructions for the Direct Connect Coupler (DCC), Model MM110. (Potomac Micro Magic, Inc.).

PURPOSE : To increase reliability and standardize all remotely located telephone couplers used at RAMOS/T sites.

EQUIPMENT AFFECTED : All telephone couplers located at RAMOS/T sites.

PARTS REQUIRED : 1-Direct Connect Coupler (DCC), NWS SO10-3A2  
1-Wire Harness, DCC to Comms, Enclosure TB1, SO10-3A2W1 (supplied).  
1-Wire harness, Comms, Enclosure TB1 to BEA chassis 5144 (supplied).  
1-Wire harness, DCC to telephone jack (supplied with SO10-3A2).

MOD PROCUREMENT : This modification will be sent to all RAMOS/T stations.

SPECIAL TOOLS : None.

TEST EQUIPMENT : None.

TIME REQUIRED : 1 work hour.

General:

The Direct Connect Coupler (DCC) MM110 is being used to standardize all remotely located telephone couplers used in conjunction with the Remote Automatic Meteorological Observing Systems Telephone Type (RAMOSIT). Its purpose is to increase reliability and bring this portion of the system into today's electronics by use of the solid state applications.

- I. Replacement of the telephone coupler type 500A, (LaBarge #93D951-101 or 93A681) and the dial-up interface module, LaBarge #94D1532.



A. Procedure: Steps 1 through 17 should be accomplished in completing this modification.

1. Switch power off of 1A2 battery equalizer assembly (1A2S201).
2. Disconnect P144 from the BEA (1A1) chassis.
3. Disconnect P201 from the battery equalizer assembly (1A2).
4. Replace the cable between J144 of the BEA chassis and the comms enclosure TB1 with the cable supplied. Connection is as follows:

<u>J144</u>	<u>CABLE</u>	<u>TB1</u>
B	SHIELD/CLEAR	4
C	GREEN	5
D	WHITE	6
A	RED	7
E	BLACK	8

5. Remove the dial-up interface module (3A1) out of the comms chassis.
6. Disconnect the wire harness between J401, and TB1 and TB2 and remove the harness.
7. Remove the telephone coupler assembly (3A2) and the wire harness that connects to TB2.
8. Connect the DCC wire harness (S010-3A2W1) as follows:

<u>TB1</u>	<u>WIRE COLOR</u>
1	----- RED
2	----- BLACK
4	----- ORANGE
5	----- GREEN
6	----- BLUE
7	----- BROWN
8	----- WHITE

9. Reconnect P201 to the BEA chassis and switch power on at the battery equalizer assembly (1A2S201).

10. With the DC multimeter, determine that the following voltages are present on the DB 25 pin connector of the SO10-3A2W1 cable:

<u>PIN</u>	<u>VOLTAGE (VDC)</u>
1	+ 13.5
2	-0- (GND)
3-25	-0-

11. Switch power off (1A2S201) on the battery equalizer assembly.
12. Connect the DB 25 pin connector to the DCC and place it in the bottom of the comms enclosure.
13. Reconnect P144. Switch power back on (1A2S201).
14. You have a modular duplex adapter at your site. Plug it into the phone jack on the DCC, plug telephone company supplied line into the adapter.
15. Temporarily reconnect the telephone to call your station for a test of the DCC, using the supplied telephone adapter.
16. Leave the telephone adapter in the DCC.
17. Leave the telephone in the comms enclosure and dispose of all parts according to Regional Policy.
- B. Procedure: Note only an authorized FCC licensed repair facility is authorized to effect repair on the DCC. Steps 1 and 2 should be noted in completing this modification.
1. The issuance of the DCC will be controlled through W/OTS141 Surface Special Projects until field implementation is completed in all regions. Station spares for the DCC will be provided.
  2. DCC units in need of repair will be forwarded by the field station to National Reconditioning Center, Attn: W/OTS16 in accordance with EHB-4, Part 3, WS Form H-30, Equipment Return Tag.

II. INSTRUCTION MANUAL CHANGES:

## Changes in RAMOS Manual:

A. Place a large X across page 2-46 remove page 2-47 and pages 2-309 through 2-322 in Volume 2. Insert copies of enclosed pages (change 2) into proper areas of manual.

1. On page A in Volumes 1-2-3 make pen-and-ink change opposite (2-46) - (2-47) to change No. 2.

2. On page B in Volumes 1-2-3 make pen-and-ink change opposite (2-309) - (2-310) (2-311/2-312) (2-313) - (2-316) (2-317) - (2-322) to change No. 2.

3. Under record of changes ADD Change No. 2 Date 4-23-84  
Brief Description revisions for direct connect coupler  
Entered By W/OTS141.

B. Schematics and/or Diagrams

1. See attached DCC cable assembly for RAMOS Drawing No. S010-3A2W1-SD001.

UNIT 3 COMMUNICATIONS ASSEMBLY TYPE II (DIAL-UP)

DELETED

Replaced By DIRECT CONNECT COUPLER (DCC) (MM110)  
AS OF MARCH 1984

REFER TO RAMOS MODIFICATION NOTE NO. 6

Pages 2-309 through 322 and 2-47  
revised 3-27-84

CHANGE 2

UNIT 3 COMMUNICATIONS ASSEMBLY TYPE II (DIAL-UP)

DELETED

REPLACED BY DIRECT CONNECT COUPLER (DCC) (MM110)  
AS OF MARCH 1984

REFER TO RAMOS MODIFICATION NOTE NO. 6

Pages 2-309 through 322 and 2-47  
revised 3-27-84

CHANGE 2

UNIT 3 COMMUNICATIONS ASSEMBLY TYPE II (DIAL-UP)

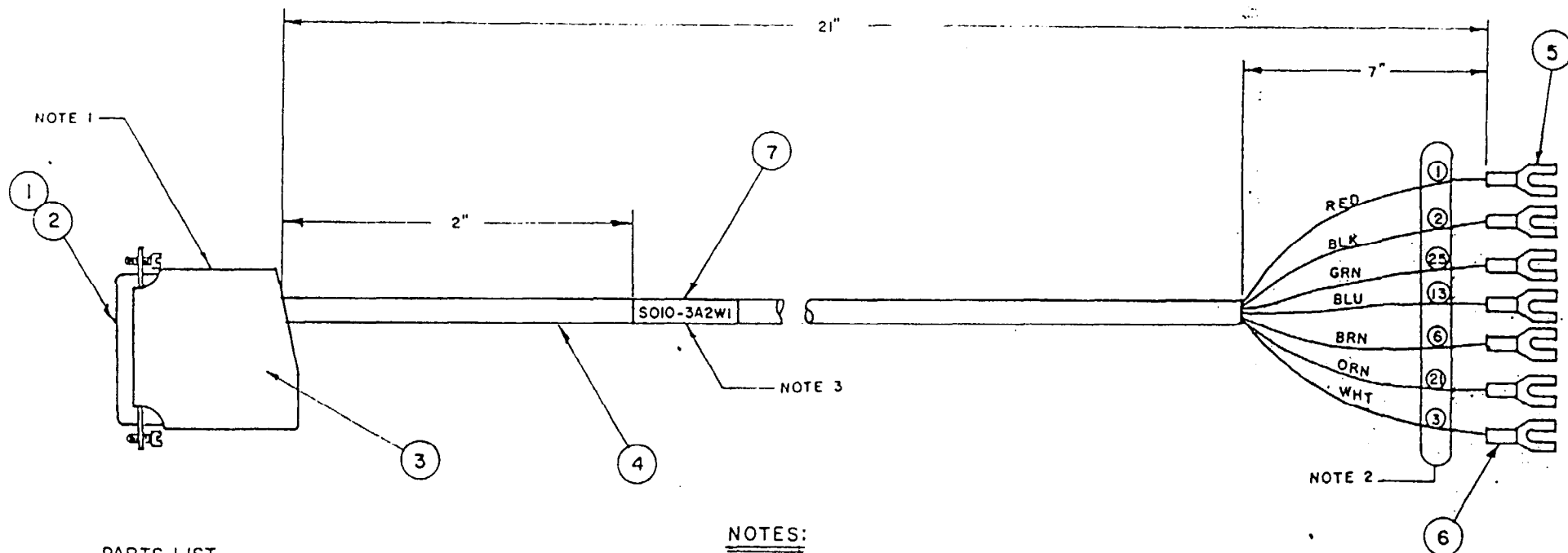
DELETED

REPLACED BY DIRECT CONNECT COUPLER (DCC) (MM110)  
AS OF MARCH 1984

REFER TO RAMOS MODIFICATION NOTE NO. 6

Pages 2-309 through 322 and 2-47  
revised 3-27-84

CHANGE 2



### PARTS LIST

1. CONNECTOR AMP 205207-1
2. PINS - AMP 66569-3
3. CLAMP KIT AMP 206478-3
4. CABLE, 7 CONDUCTOR BELDEN 9430 ALPHA 1177
5. SPADE LUG #6
6. SHRINK TUBE, ALPHA FIT 221 - 1/8
7. MARKER, #SO10-3A2W1

### NOTES:

1. INSIDE THE CLAMP KIT CONNECT PIN 11 TO PIN 18
2. THE CIRCLED NUMBERS ARE THE PIN NUMBERS IN CONNECTOR 1
3. WIRE MARKERS LABELED AS SHOWN ON DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES: ANGLES $\pm .5^\circ$ 3 PLACE DEC. $\pm .005$ 2 PLACE DEC. $\pm .02$		ENGINEERING DIVISION SILVER SPRING, MD. 20910		U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION NATIONAL WEATHER SERVICE			
MATERIAL		PREPARED	R.E.B.	4/12/82	DCC CABLE ASSEMBLY FOR RAMOS		
		CHECKED					
		DESIGN					
		APPROVED BY					
		APPROVED BY			SIZE	DATE	DRAWING NO. SO10-3A2W1-SD001
		SCALE		SHEET	FILE		



U.S. DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL WEATHER SERVICE  
Silver Spring, Md. 20910

W/OS0321 - WDH

January 22, 1987

TO: All NWS Regional Headquarters, Area Electronics Supervisors, and  
Electronics Technicians (EHB-11 Distribution)

FROM: W/OS03 - <sup>for</sup> J. Michael St. Clair *Robert L. Kniff*

SUBJECT: Transmittal Memorandum for Engineering Handbook No. 11, Issuance 87-1

1. Material Transmitted:

Engineering Handbook No. 11, Automatic Observing Equipment, Section 3.3;  
Errata No. 1 to RAMOS Modification Note 6.

2. Summary:

Errata No. 1 updates RAMOS DCC cable assembly instructions with pen-and-ink changes.

3. Effect on Other Instructions:

None.

EHB-11  
Issuance 87-1





ERRATA NO. 1 TO MODIFICATION NOTE 6

On drawing #S010-3A2W1-SD001, at the end of note 1, add the following: "and pin 10 to pin 23".



U.S. DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL WEATHER SERVICE  
Silver Spring, Md. 20910

October 12, 1984

W/OTS141 -TEC

TO: All NWS Regional Headquarter, Area Electronics Supervisors,  
and Electronics Technicians (EHB-11 Distribution)

FROM: W/OTS1 - J. Michael St. Clair *J. M. St. Clair*

SUBJECT: Transmittal Memorandum for Engineering Handbook No. 11, Issuance 84- 8

1. Material Transmitted:

Engineering Handbook No. 11 Automatic Observing Equipment, Section 3.3.  
RAMOS Voltage Monitor Modification Note 7.

2. Summary:

The voltage monitor module provides a readout of the battery voltage. The readout will be in tens, units, and tenths and is preceded by the letter 'v'. For example, a readout of V267 indicated 26.7 volts.

3. Effect on Other Instructions:

None.

4. Certification Statement:

This modification has been successfully tested under various environmental conditions in the Laboratories of the Engineering Division, W/OTS13.

5. Reporting Modification to WSH Engineering Division:

Target date for reporting completion of this modification is Dec. 04, 1984.

All completed equipment modifications shall be reported on the H-28 Form, Engineering Progress Report in accordance with EHB-4, Part 2.

COPY

EHB-11  
Issuance 84-8

\* 4 \*

NOAA NATIONAL WEATHER SERVICE  
CHIEF, FIELD ENG SUPPORT BR.  
8060 13TH ST., RM 926  
ATTN: W/OTS14



RAMOS VOLTAGE MONITOR MODIFICATION NOTE 7  
(for Electronics Technicians)

SUBJECT : Installation and Calibration of the RAMOS Voltage Monitor Module.

PURPOSE : To provide a Digital Readout of the Battery Voltage in the BEA Chassis located at the RAMOS Site.

EQUIPMENT AFFECTED : RAMOS BEA Chassis.

PARTS REQUIRED : One RAMOS Voltage Monitor Module. No. 1A1A15.  
One RAMOS Voltage Monitor Connector

MOD PROCUREMENT : This MOD will be sent to all RAMOS EI Tech's stations.

SPECIAL TOOLS : None

TEST EQUIPMENT : Digital Multimeter

TIME REQUIRED : One Work Hour

General: The voltage monitor module can be installed in any empty sensor slot in the BEA chassis as can all of the RAMOS sensor modules. The positioning of the modules only determines the order in which the sensor readouts appear in the message. For example, if it is desired to have the voltage information follow the precipitation yes/no information, the following process should be followed:

Procedure:

I. VOLTAGE MONITOR MODULE INSTALLATION:

Steps 1 thru 9 should be accomplished in completing this modification.

1. Remove power to the BEA by turning S101 to "off".
2. Remove the Service Module.
3. Remove the red polarization key from the card edge connector in slot J121.

4. Remove the red polarization key from the card edge connector where the Service Module. was installed (J110), and insert the key in the same position in J121.
5. Install Voltage Monitor Module in J110, and Service Module in J121.
6. Move Connector from J120 to J131.
7. Install the Voltage Monitor connector in J120.
8. Return power to the BEA by turning S101 to "on".
9. If the message was BT56 H56 W26 /15 G017 P028 Q011 RNO CR LF before the Voltage Monitor Module was installed, the message after the Voltage Monitor installation should be BT56 H56 W26 /15 G017 P028 Q011 RNO V267 CR LF.

II. INSTRUCTION MANUAL CHANGES: The RAMOS Manual is being revised and pages are being added.

- A. Insert copies of enclosed pages (Change 2) into proper areas of manual.
  1. RAMOS, Volume 2, Troubleshooting/Repair Volume, Pages 2-264A-B-C-D.
- B. Schematics and/or Diagrams
  1. RAMOS Voltage Monitor Schematic drawing No. S010-1A1A15-SD001 enclosed.
- C. Parts List/Board Layout drawing No. S010-1A1A1S-SD002 enclosed.

Attachments:

Voltage Monitor Operation, Page 2-264A

Calibration Procedure, Page 2-264B

Schematic Drawing, Page 2-264C

Parts List/Board Layout, Page 2-264D

## 1A1A15 Voltage Monitor Operation

The voltage monitor module provides a precise, scalar voltage proportional to battery voltage (analog), four high sensor identification bits (M2, M3, M5, M7 = V), and connects the sensor skip and MSD zero skiplines to return when the sensor is selected (sensor select goes high). The low MSD zero skip causes the most significant digit to be printed even if it is zero, and the low sensor skip enables analog to digital conversion. Items 1 thru 7 provides an explanation of how the circuit operates.

### 1. C-PWR-1 POWER (P129-19, 20, 21, 22)

Distributes the DC voltages for Voltage Monitor Module operation.

### 2. N-VD-1 VOLTAGE DIVIDER (U4 and C1)

Divides the battery voltage by 10 to obtain a signal in the 10 volt range of the A-D converter module. Capacitor C1 attenuates high frequency noise.

### 3. Q-SW-1 SWITCH (Q1, R3, R6, and R7)

Provides a path to return to enable I-AMP-1 when SENSOR SELECT goes high during RAMOS interrogation response.

### 4. I-AMP-1 AMPLIFIER (U1, R1, R2, and R4)

Connects the output of N-VD-1 to the ANALOG line when enabled by Q-SW-1.

### 5. I-GATE-1 GATE (U3C and R5)

Gates a high to enable I-SW-2 when Voltage Monitor Module is selected (SENSOR SELECT high) and SENSOR IDENT goes high.

### 6. I-SW-1 SWITCH (U3B and U3D)

Connects the SENSOR SKIP and MSD ZERO SKIP lines to return when SENSOR SELECT goes high. The low MSD ZERO SKIP prevents zero most significant digit from being skipped. The low SENSOR SKIP indicates that analog to digital conversion is required.

### 7. I-SW-2 SWITCH (U2)

Connect a logic high (+5V) to the M2, M3, M5 and M7 ASCII lines (V) when I-GAT-1 output is high.

## 1A1A15 VOLTAGE MONITOR MODULE CALIBRATION

1. Install 1A1A15 Voltage Monitor Module to be calibrated into the Extender Module and install the combination into J102. Ensure J112 has no connection.
2. Connect a jumper between TP1 and TP2.
3. Apply power to system by placing S201 of unit 1A2 and S1O1 of unit 1A1 to the ON position.
4. Monitor J102-17 and adjust R1 for  $0.000 \pm 0.001$  vdc.

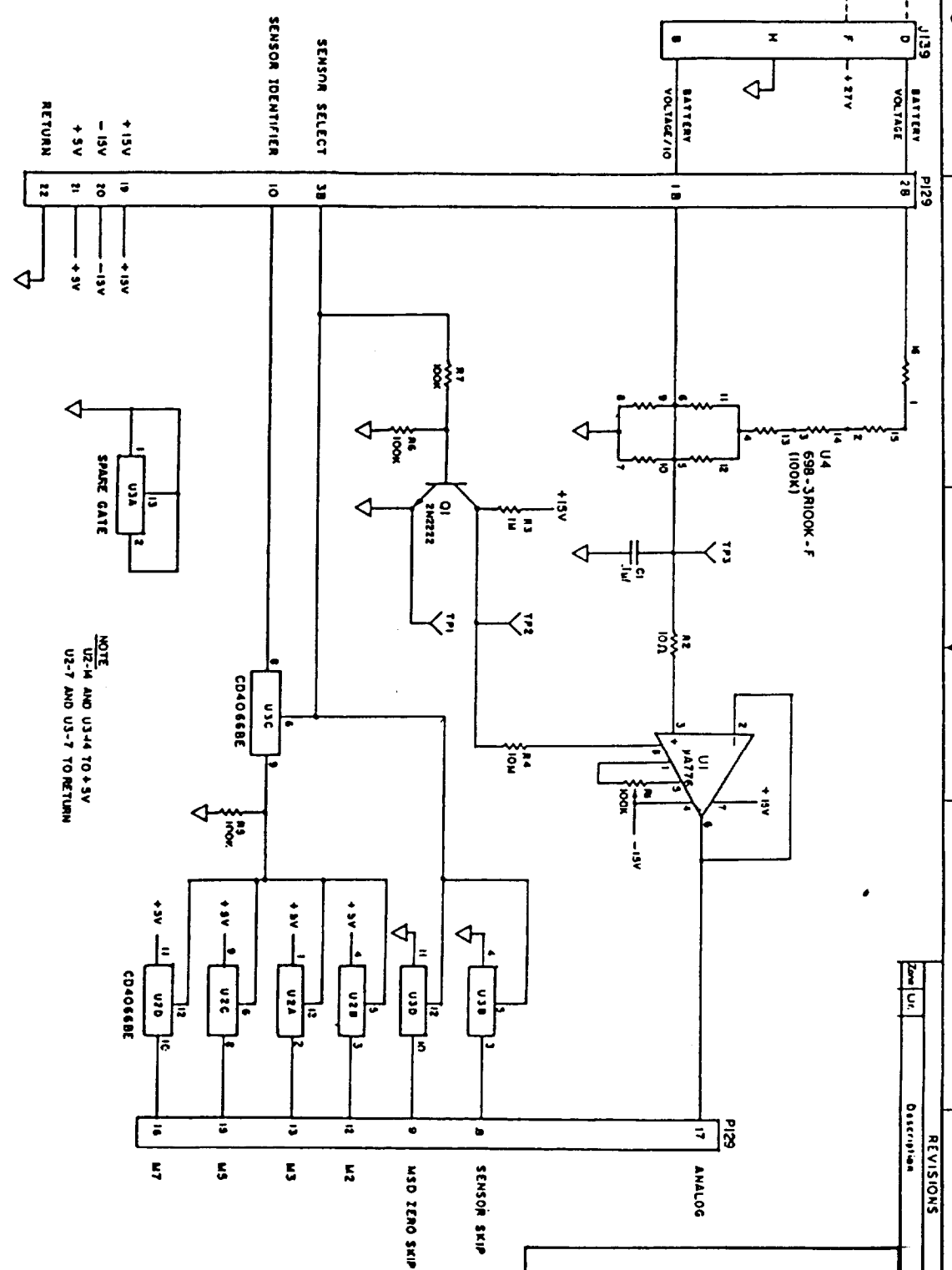
### NOTE

Ground may be obtained from J102-22, J148, or J102-3A. Use corresponding terminals on the extender module for J102 connections. All monitor voltage readings will be in respect to ground.

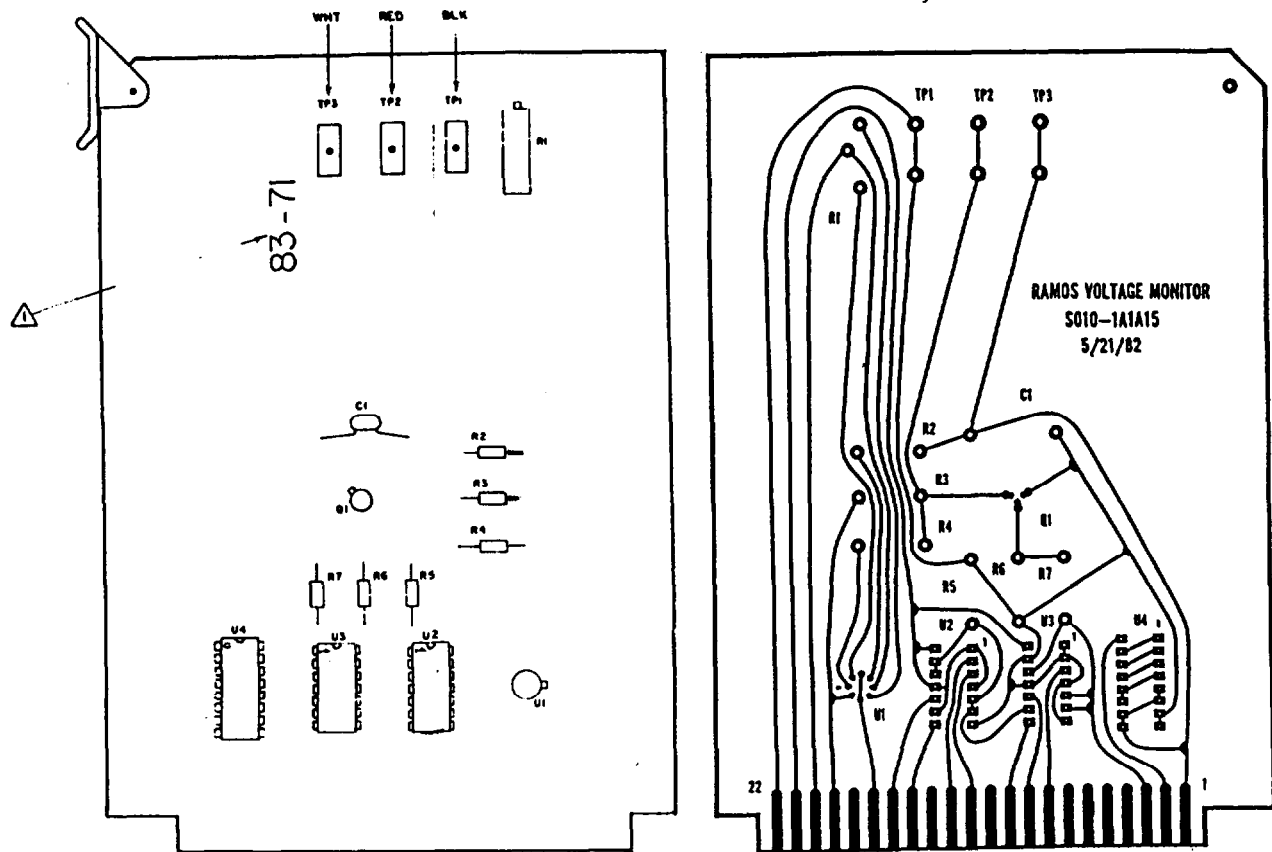
REVISIONS			
Rev	By	Description	Date
1			

# RAMOS VOLTAGE MONITOR SCHEMATIC

DRAWING NO.  
S010-1A1A1S-SD001



2-2 64C



S010-1A1A15  
FRONT VIEW

VOLTAGE MONITOR PCB

BACK VIEW

CARD EJECTOR		1	415-7036-01
TP1,2,3	PCB HORIZONTAL JACKS-BLK, RED, WHT.	3	105-0750-001
C1	0.1 $\mu$ f 100VDC 20%	1	8131-100-651-104M
R5,6,7	100K $\Omega$ 1/4W 10%	3	
R4	10M $\Omega$ 1/4 W 10%	1	
R3	1M $\Omega$ 1/4 W 10%	1	
R2	10 $\Omega$ 1/4W 10%	1	
R1	RESISTOR 100K $\Omega$ POTENTIOMETER	1	3009P-1-104.
PRINTED CIRCUIT BOARD			
U4	100K $\Omega$ F RESISTOR NETWORK	1	698-3R100K-F
U2,U3	QUAD BILATERAL SWITCH	2	CD4066BE
U1	OP-AMP	1	UA776





**U.S. DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
NATIONAL WEATHER SERVICE  
Silver Spring, Md. 20910

October 15, 1984 W/OTS141 - TEC

TO: All NWS Regional Headquarters, Area Electronics Supervisors,  
and Electronics Technicians (EHB-11 Distribution)

FROM: W/OTS1 - J. Michael St. Clair *J. M. St. Clair*

SUBJECT: Transmittal Memorandum for Engineering Handbook No. 11, Issuance 84-9

1. Material Transmitted:

Engineering Handbook No. 11, Automatic Observing Equipment, Section 3.3;  
Modification Note No. 8, RAMOS/T Battery Monitor and Identification Module  
(S010-1A1A4) Precip Counter Reset Problems.

2. Summary:

Modification Note No. 8 provides instructions to prevent erroneous reset  
of the Precipitation Accumulator Counter. This modification is to be used  
on the RAMOS/T and, if need, the RAMOS/S installation. It does not apply  
to MED, VHF, and dedicated line applications.

3. Effect on Other Instructions:

None.

4. Certification Statement:

This modification has been tested by the Engineering Division, W/OTS13,  
and has performed as required.

5. Reporting Modification to WSH Engineering Division:

Target date for completion of this modification is Dec. 04, 1984

All completed equipment modifications shall be reported as instructed in  
EHB-4, Part 2, Engineering Progress Report, WS Form H-28.

COPY

EHB-11  
Issuance 84-9



RAMOS MODIFICATION NOTE 8  
(For Electronics Technicians)

SUBJECT : RAMOS/T Battery Monitor and Identification Module (S010-1A1A4) Precip Counter Reset Problems.

PURPOSE : To prevent erroneous reset of the Precipitation Accumulator Counter.

EQUIPMENT AFFECTED : All RAMOS/T installations and any RAMOS/S installation that is experiencing the same problem.

PARTS REQUIRED : None.

MOD PROCUREMENT : None.

SPECIAL TOOLS : None.

TEST EQUIPMENT : None.

TIME REQUIRED : 1 Work hour.

General: The precipitation accumulation counters used in the telephone interrogated RAMOS's (RAMOS/T) are resetting; they should not reset since CADAS computes 24-hour totals by comparing yesterday's 12Z total to today's. When a reset occurs, a loss of accurate data occurs. Usually a very large 24-hour total results (often larger than 9.00 inches). The purpose of this modification is to prevent this occurrence.

PROCEDURE: Steps 1 through 5 should be accomplished in completing this modification.

1. Modify the station spare PWB S010-1A1A4 in the following manner. Obtain a very sharp knife -- "Exacto" or equal. Remove a portion of the land using the attached drawing (enlarged back view 1A1A4) as your guide. This will open the output of Pin #2 of the integrated circuit in location 2-B. Make the cut as close to pin #2 as possible, leaving enough land material, so it can be restored to original condition if it should need to be returned to NRC.
2. Proceed to RAMOS/T Site and exchange boards.

EHB-11  
Issuance 84-9  
10-15-84

3. Test the printed wiring board to be certain the manual reset function of Switch 1 is still operational and there is a proper output from P1 Pin #8 Sensor Skip. (Refer to Page 2-147). (P1-8 should be HIGH except when S1 is pressed).
4. Repeat Step 1 for the board you removed from the system.
5. Test the functions of the "Original Board" and this will complete the modification. (Refer to Step 3).

#### INSTRUCTIONS MANUAL CHANGES:

##### A. Instruction Material:

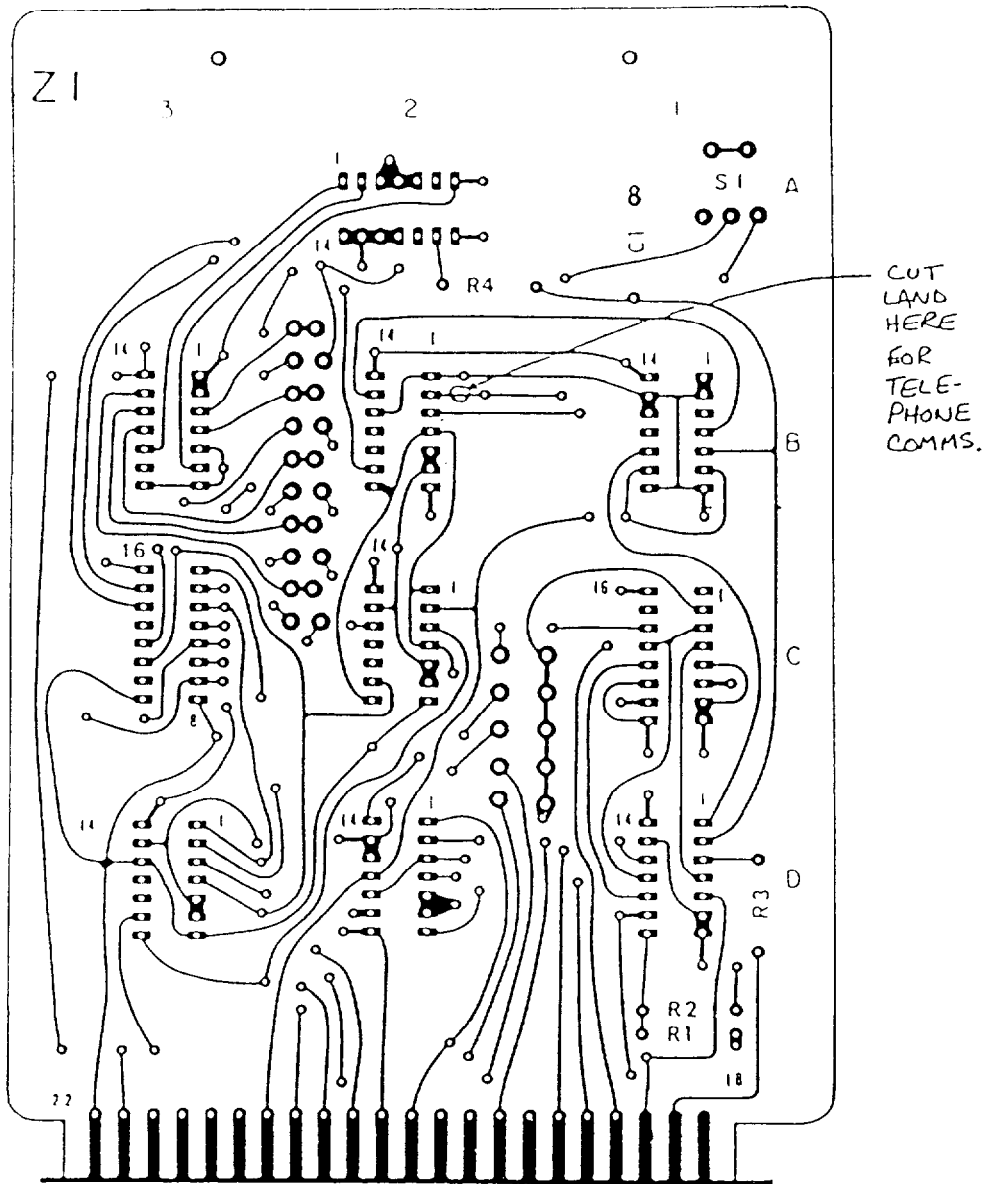
1. None.

##### B. Schematics and/or Diagrams:

1. Back view of SO1O-1A1A4 PUB. (A copy should be placed in the RAMOS Handbook #2, after Page 2-153.)
2. Component view and FOMMS diagram. (A copy should be placed after Insert #1, Page 2-153.)
3. A reminder - this material is only for use with RAMOS/T and RAMOS/S where needed.

##### C. Parts List:

None.



Back View 1A1A4



U.S. DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL WEATHER SERVICE  
Silver Spring, Md. 20910

*Not Published  
By Surface*

W/OTS141 - WDH

TO: All NWS Regional Headquarters, Area Electronics Supervisors,  
and Electronics Technicians (EHB-11 Distribution)

FROM: W/OTS1 - J. Michael St. Clair

SUBJECT: Transmittal Memorandum for Engineering Handbook No. 11, Issuance 85-

1. Material Transmitted:

Engineering Handbook No. 11 - Automatic Observing Equipment, Section 3.3,  
RAMOS Modification Note 9: EPROM Installation and Programming  
Instructions for the Handar 545 Programming Set.

2. Summary:

This modification updates the Handar 545 Programming Set, permitting  
display of the RAMOS message.

3. Effect on Other Instructions:

None.

4. Certification Statement:

This modification has been successfully field tested for system  
operational integrity at Albuquerque, New Mexico and Phoenix, Arizona.

5. Reporting Modification to WSH Engineering Division:

Target date for reporting completion of this modification is

All completed equipment modifications shall be reported on the Form H-28,  
Engineering Progress Report, according to instructions contained in EHB-4,  
Part 2 (see attached exhibit).

*To be  
Handled by  
Hydro*

EHB-11  
Issuance 85-



RAMOS MODIFICATION NOTE 9  
(For Electronics Technicians)

SUBJECT : EPROM Installation and Programming Instructions  
for the Handar 545 Programming Set

PURPOSE : To update the Handar 545 Programming Set to  
enable it to display the RAMOS message

EQUIPMENT AFFECTED : Handar 545 Programming Set, D900-2

PARTS REQUIRED : One EPROM marked "Handar 545-5 REV 4"

MOD PROCUREMENT : EPROM and modification note will be sent to all  
Handar sites

SPECIAL TOOLS : None  
REQUIRED

TEST EQUIPMENT : None  
REQUIRED

TIME REQUIRED : 1 Hour

General:

This modification is a maintenance aid which gives the Programming Set the capability of displaying the RAMOS message at the RAMOS site. Parts I, II, and III must be performed to complete this modification.

I. Handar 545 Programming Set EPROM Replacement.

- A. Preparation: Load any program that you may have saved in the Programming Set (and don't want to lose) into a 540A or 560A DCP for safekeeping while the new firmware is being installed.
- B. Caution: Leave the EPROM in its protective antistatic foam until you are ready to insert it. Be aware and take standard antistatic precautions when handling EPROM's.

C. Procedure:

1. Remove the two fuses marked "BATTERY" and "EXTERNAL DC." These fuses are located on the front panel of the 545A Programming Set, (Saved program and clock setting will be lost.)
2. Remove four screws; one on each side of the handle and the other two on the hinge side of the case.
3. Use a large common screwdriver to lift the lower edge of the panel out of the case. (The rubber shock mounts will slightly resist removal.)
4. Lift the unit from the case and set the case aside. Place the panel face down on a soft surface.
5. Remove the eight screws holding the bottom cover; lift the cover from the unit and set it aside.
6. Turn the unit so that the battery is away from you. The CPU board (540-6003) is on your left with the five EPROM sockets (where the firmware will be installed) at the bottom closest to you.
7. The CPU Board may have 24 pin sockets in some older 545A's or 28 pin sockets in others. You will find EPROM's in one or more of the sockets. The EPROM sockets are numbered from left to right, one to five. Look at the drawing, Figure 1, for their location. Find the new EPROM marked 545-5 on the label. This EPROM plugs into the CPU board of the programming set in socket number five. Remove EPROM #5 by carefully inserting a common screwdriver under the EPROM and twisting slightly, easy as it goes, in order to force the EPROM straight out of its socket without bending the pins.
8. If your board has 28 pin sockets, then plug in the new EPROM so that pins 1, 2, 27, and 28 of the socket are left exposed. In other words, pin 1 of the EPROM plugs into pin 3 of the socket. See Figure 2 for a guide. (If your board has 24 pin EPROM sockets, then just plug it in normally.)

9. Reinstall the bottom cover replacing the eight screws. Carefully insert the unit back into the case. You will have to use a common screwdriver or other similar tool to "shoe-horn" the rubber shock mounts back into position. Replace the four original screws that hold the 545A in the case.
10. Replace the two fuses. If you have a program loaded into a platform for safekeeping, save it into the 545A. Now reset the time and date in the 545A (it must be disconnected from the DCP).

## II. Programming for Maintenance:

The following procedure enables the technician to perform maintenance work on the RAMOS, using the HANDAR 545 Programming Set to display the RAMOS message. Familiarity with RAMOS Modification Note 5 is desirable.

### Procedure

1. Connect the HANDAR 545A Programming Set to the HANDAR 540 Data Collection Platform (DCP). This is achieved by attaching the cable from the connector on the 545 programming set marked "Program I/O" to the mating connector on the 540 DCP marked "Program I/O."
2. Turn off the RAMOS, remove the service card, and then turn RAMOS back on. (If the service card is left in, a carriage return in the RAMOS message causes the buffer to be erased. The result is a blank display.)
3. At this point, the DCP may need to be programmed. If the display reads "SYSTEM PROG REQUIRED-PRESS ID," the system needs to be programmed. Refer to "Programming Procedures," RAMOS Modification Note 5.
4. Put the programming set in the programming mode by pressing "PROG" followed by "2," "ENTER." The display should read "P HANDAR 540A DCP-REV X.X." Unless you have just programmed the system in step 2, you need to save the program. Press "SAVE," then ENTER." Proceed after display reads "DONE."
5. Press "XMIT." "GOES PRI XMT MODE" will be displayed. Set this to zero by pressing "0," "ENTER." (This cancels the transmitting mode for the time being.)



6. Press "MEAS" to display the sensor information. Press the scroll down key until "MEAS INTERVAL 01:00:00" appears. Change to a 1 minute interval by pressing "00:01:00," "ENTER." "CHANGE ALL CHANS? (1)=Y (2)=N" will appear. Press "1," "ENTER." Display should now read "MEAS INTERVAL 00:01:00." This causes the HANDAR DCP to read the RAMOS once per minute.
7. Press scroll down key again and "START OF MEAS" will be displayed. The Start of Meas time should be 3 to 5 minutes ahead of the present time. Enter the appropriate time in Greenwich Mean Time. Press "ENTER" followed by "1," "ENTER" to enter the information. The display should read your entered time.
8. Press "RUN" to get into the run mode. The display should read "R RUN/MONITOR MODE." To see the time until the next scan, press "NSCAN" (you may continue to press "NSCAN" to update displayed time until the next scan). If the amount of time until the next scan is more than 5 minutes, then repeat Step 7. NOTE: The RAMOS must make its first scan before you proceed to Step 9.
9. The following sequence allows you to read the buffer. It can be repeated as often as needed.
 

Press "F4," "B" to enter the text editor. (The display should now be blank.)

Press "F4," "D" to display the buffer. (The display will be up to 40 characters of the RAMOS message.) *ONLY DISPLAYING MESSAGE FOR 1-1-1*

Press "F4," "CLEAR" to clear the buffer.

Press "F4," "C" to leave the text editor.
10. Turn off the RAMOS, reinsert the service card, and turn the RAMOS back on.
11. Press "PROG." "ENTER (1)=SERVICE (2)=ALL" will appear. Press "2," "ENTER" to get into the program mode. The display should read "P HANDAR 540A DCP-REV X.X."

*ALBUQUERQUE, NM  
JAN 11 1970 14:47-2170*

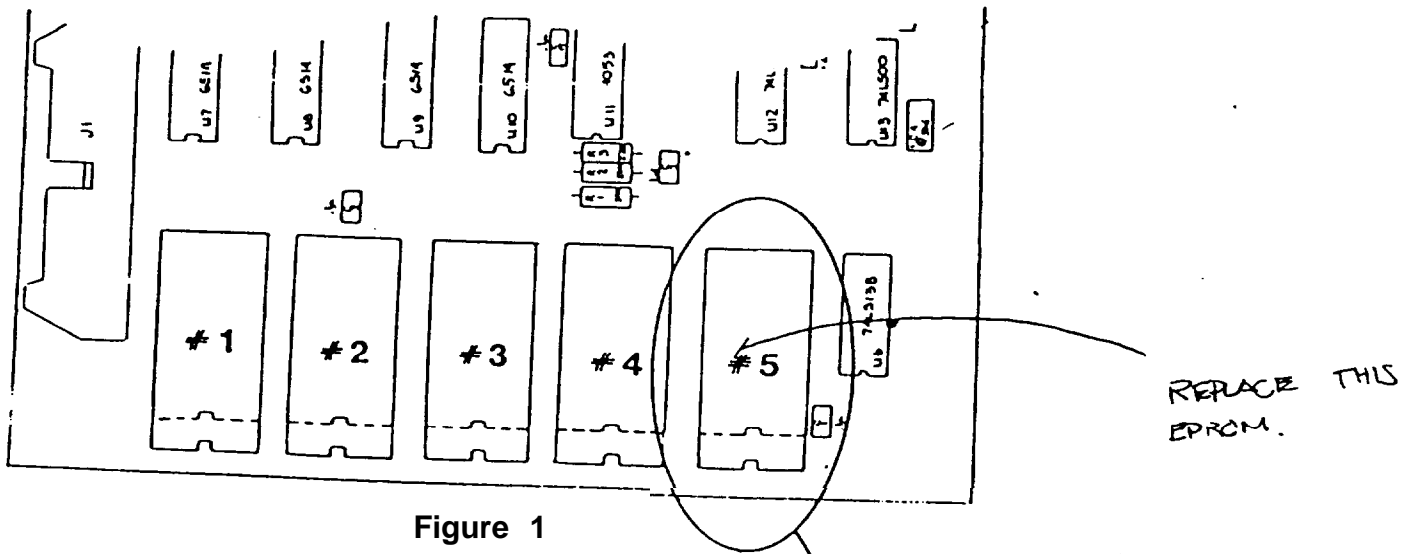
12. Press "LOAD," "ENTER." This will load the program you previously saved in the programming set into the DCP. After "DONE" appears, proceed.
13. Press "XMIT," then press the scroll down key. The "1ST GOES XMT TIME" may have to be changed. (Consult Table 1 in the RAMOS Modification Note 5 for the proper time.) The first transmit time should occur within the next hour. To change the time, enter the appropriate time in the following format "hh:mm:ss," then press "ENTER."
14. Press "MEAS," then press the scroll down key until you reach 'START OF MEAS 00:00:00.'" Set this time to 2 minutes before the first GOES XMT TIME. After prompt, press "1," "ENTER."
15. Press "RUN" to get into the run mode.
16. Press "NSCAN" and "NXMIT," both times should be within the next hour.
17. Disconnect the programming set.

### III. Disposition of Removed Part

If the EPROM replacement is a success, the replaced EPROM should be sent to Attn: Thomas Cavanagh, National Weather Service, 8060 13th Street, W/OTS141, Silver Spring, MD 20910. They will be erased, reprogrammed and redistributed to other stations. If the EPROM replacement is a failure, restore the HANDAR Programming Set to its former status and immediately send the EPROM'S to the above address with an explanation.

### IV. Instruction Manual Changes

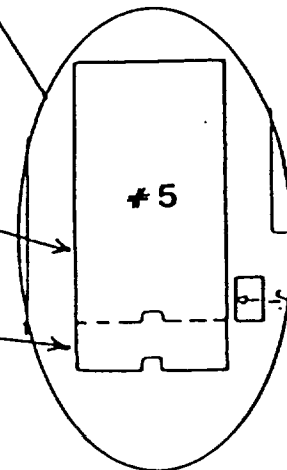
None.



24 pin EPROM  
(2532)

28 pin EPROM  
(2564)

Figure 2



<i>Issue Date</i>	<i>Org. Code</i>
2-5-92	W/OS032

# NATIONAL WEATHER SERVICE

## Engineering Handbook

<i>Program</i>	<i>Part</i>	<i>Section</i>
EHB- 11	03	3. 4

### MODIFICATION INDEX - MANUAL ENTRY DEVICE

<u>Number</u>	<u>Date of Issue</u>	<u>Title</u>
1	August 3, 1983	AMOS Teletype Interface PC Board 1A9
2	September 12, 1984	Erasable Programmable Read Only Memory (MED)
3	September 25, 1984	Addition of Two Insulated Jumpers to the RAMOS MED 1A3 Board
4	September 19, 1985	Conversion to RS232C Communications
5	March 6, 1986	Activation of RAMOS Resets



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL WEATHER SERVICE  
Silver Spring, Md. 20910

August 3, 1983

W/OTS141 - TEC

TO: All NWS Regional Headquarters, Area Electronics Supervisors,  
and Electronics Technicians (EHB-11 Distribution)

FROM: W/OTS1 - J. Michael St. Clair *J. Michael St. Clair*

SUBJECT: *for* Transmittal Memorandum for Engineering Handbook No. 11,  
Issuance No. 83-3

1. Material Transmitted:

Engineering Handbook No. 11 - Automatic Observing Equipment, Section  
3.4: MED Modification Note No. 1: AMOS Teletype Interface Printed  
Circuit Board 1A9.

2. Summary:

Modification Note No. 1 provides the Electronics Technician with  
instructions for correcting a potential electrical fire hazard in the  
MED. Testing of this modification is deemed unnecessary as it changes  
MED circuitry to be identical with previously tested AMOS circuitry.

3. Effect on Other Instructions:

Pen-and-Ink Changes to Manual.

4. Reporting Equipment Modifications:

Target date for reporting completion of this modification is  
October 15, 1983.

All completed equipment modifications shall be reported on WS Form  
H-28 Engineering Progress Report, in accordance with EHB-4, Part 2.

5. Certification Statement:

This modification has been successfully field tested in-house, due to  
the similarity of the AMOS application, for system operational  
integrity.

EHB-11  
Issuance 83- 3



Engineering Division  
W/OTS14

MED Modification Note No. 1  
(For Electronics Technicians)

SUBJECT : AMOS Teletype Interface Printed Circuit Board 1A9  
PURPOSE : To Eliminate Potential Electrical Fire Hazard  
EQUIPMENT AFFECTED : All MED Systems  
PARTS REQUIRED : Hookup Wire and Solder (AWG 22)  
MOD PROCUREMENT : Purchase Locally if not already on hand  
SPECIAL TOOLS  
REQUIRED : None  
TEST EQUIPMENT  
REQUIRED : None  
TIME REQUIRED : One Work Hour

General: --This modification to the AMOS Teletype Interface 1A9 will eliminate a potential electrical fire hazard and conform the MED to the Telephone Company's closed circuit resistance specification. The modification consists of eliminating resistor 1A9 R10 (120 ohm 5 watts) from the circuit by replacing it with a piece of hookup wire. Additional background information can be found in the last section of this modification note.

PROCEDURE:

1. Turn off MED power.
2. Consult MED Instruction Manual 11-105, Type A, Volume 1. Read the precautions concerning the Service A Teletype Loop found in Section 5-3 c(3), which begins on Page 5-4.
3. After coordinating with FAA and AT&T, disconnect the MED from Service A.
4. Disconnect remaining cables and move MED to suitable work area.
5. Consult MED Instruction Manual 11-105, Type A, Volume 2. Page 4-19 is an assembly drawing which may prove helpful. Place the MED on its back with its bottom toward you.
6. Remove the bottom access cover.
7. Remove the four 1/4" hex nuts and washers supporting the 1A9 PCB.

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Issuance 83- 3  
8-3-83

8. Carefully lift the 1A9 PCB. It has wires connected to it, but you should be able to maneuver it so that you access R10. R10 is a 120-ohm, 5-watt resistor. If necessary, consult MED Instruction Manual, Type B, Page 5-6 for location of R10.
9. Unsolder R10 and replace it with a piece of hookup wire, (solder in place).
10. Reassemble and reconnect, starting with Step 8 and reversing procedure through Step 1.
11. Verify proper operation. Refer to MED Instruction Manual, Type A, Volume 1. Use Section 5-3 d&e, Pages 5-7 through 5-8, for an AMOS MED. Use Section 5-4 e&f, Pages 5-12 through 5-15 for a RAMOS MED.

This completes the modification.

MANUAL CHANGES: Using pen-and-ink make the following changes to the MED Instruction Manual, Type B:

1. Page 5-6: Make a note in upper-left corner of page, "R10 deleted, MED Mod Note No. 1." Draw an arrow to R10 in upper-left corner of PCB.
2. Page 5-7: Draw single line through Name and Description of R10. Add note: "Deleted MED Mod Note No. 1."
3. Page 5-9: Overwrite resistor R10 with solid line. Line out "R10" and "120." Add note: "Deleted MED Mod Note No. 1."



**U.S. DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
NATIONAL WEATHER SERVICE  
Silver Spring, Md. 20910

W/OTS141 - WDH

TO: All NWS Regional Headquarters, Area Electronics Supervisors,  
and Electronics Technicians (EHB-11 Distribution)

FROM: W/OTS1 - J. Michael St. Clair *J. M. St. Clair*

SUBJECT: Transmittal Memorandum for Engineering Handbook No. 11, Issuance 84-

1. Material Transmitted:

Engineering Handbook No. 11, Section 3.4, MED Modification Note 2:  
Installation Instructions for the Manual Entry Device (MED) EPROM's.

2. Summary:

This modification note provides for the installation of the MED set of  
erasable programmable read-only memories (EPROM's).

3. Effect on Other Instructions:

AMOS/RAMOS enclosed changes.

4. Certification Statement:

This modification has been successfully field tested for system opera-  
tional integrity at Mt. Shasta, California and Pendleton, Oregon and  
W/OTS13.

5. Reporting Modification to WSH Engineering Division:

Target date for reporting the completion of this modification is 01/04/85.

All completed equipment modifications shall be reported on the H-28 Form,  
Engineering Progress Report, in accordance with EHB-4, Part 2.

EHB-11  
Issuance 84-





Engineering Division  
W/OTS14

MED MODIFICATION NOTE 2 (AMOS/RAMOS)  
(For Electronics Technicians)

SUBJECT : Installation Instructions for the Manual Entry Device (MED) EPROMS

PURPOSE : To correct deficiencies noted in the previous program.

EQUIPMENT AFFECTED : All AMOS/RAMOS MEDS

PARTS REQUIRED : AMOS -- 2 EPROM's for each 1A1 Display Timing PCB (U28, U29)  
3 EPROM's for each 1A2 I/O Memory PCB (U1A, U2, U3)

RAMOS -- 2 EPROM's for each 1A1 Display Timing PCB (U28, U29)  
3 EPROM's for each 1A2 I/O Memory PCB (U1R, U2, U3)  
2 EPROM's for each 1A3 Interface PWB (U20, U21)

MOD PROCUREMENT : This modification will be issued upon receipt of NOAA Form 37-4 at Engineering Division, W/OTS141, 8060 13th Street, Silver Spring, Maryland 20910, Attn: Thomas Cavanagh, Room 326. On Form 37-4, please indicate the quantities of each PCB you have. If you are requesting parts for more than one system, the location and organization code of each system must be indicated on the form.

SPECIAL TOOLS : None

REQUIRED

TIME REQUIRED : 1 Work Hour

General:

The reprogramming of the Manual Entry Device (MED) has resulted in a number of changes; most will be transparent to the operator. However, the most significant and apparent change for the AMOS MED user is that

the operator will now be able to edit the automated portion of the message on lines 3 and 4. It will no longer be necessary to append corrected data to the remarks.

The RAMOS MED has two additional major changes. The first change is that the automated message on line three is initialized to all missing: "AMOS M/M/MM/M." The incoming RAMOS message will then overwrite the M's. The second change is that RAMOS power failure and voltage monitor data will appear in the lower right corner of the display. Each time the automated message is updated, the last nine characters of line 8, in addition to all of lines 3 and 4, will be updated. Also, the last nine characters of line 8 are never transmitted on Service A.

#### I. EPROM Replacement

- A. Procedure: Steps 1 through 9 should be accomplished in completing this modification.
1. Switch MED power OFF.
  2. The usual electrostatic precautions should be taken when handling EPROM's. EPROM's should remain inserted in conductive foam until just prior to insertion into their sockets.
  3. Display timing/memory PWB (S090-1A1):
    - a. Replace EPROM's U28 and U29.
    - b. Insert all replaced EPROM's promptly into conductive foam.
  4. I/O Memory PWB (S090-1A2):
    - a. Remove EPROM's U1, U2, U3, and U4.
    - b. Install new U1A EPROM (AMOS) or U1R (RAMOS).
    - c. Install new U2 and U3 EPROM's.
    - d. Socket for U4 is intentionally left empty.
    - e. Insert all replaced EPROM's promptly into conductive foam.
  5. RAMOS-MED interface PWB (S090-1A3):
    - a. Replace EPROM U20 with new one. Install new U21 EPROM.
    - b. Insert all replaced EPROM's promptly into conductive foam.

6. Switch MED power back on.
7. After installing the new EPROM's, it is recommended that you comply with the performance check found on pages 4-1 through 4-4 of the MED Manual, Support Volume (Type A, Volume 1).

This changes the operation of the MED, the new operation will not match the old performance check exactly. Keeping in mind the changes described in "General" above, and using the performance check, you should be able to verify this modification. (The performance check is being revised and will be reprinted.)

8. Verify the spare EPROM's using the above procedure.
9. If the EPROM replacement is a success, the replaced EPROM's should be sent to Attn: Thomas Cavanagh, National Weather Service, 8060 13th Street, W/OTS141, Silver Spring, Maryland 20910. At that time they will be erased, reprogrammed and redistributed to other stations. If the EPROM replacement is a failure, restore the MED to its former status and immediately send the EPROM's to the above address with an explanation. It is important that these EPROM's be returned in a timely manner, as they are in short supply. You should use the return labels enclosed in the shipment.

## II. Instruction Manual Changes

The MED Manual is being revised and changed pages will be reprinted. These revised pages will be available through the NOAA Publications office. The revision affects the functions described below:

1. Some time ago, the automated portion of the message was moved from lines 4 and 5 to lines 3 and 4 (but the manual was never corrected). Affected pages:

Support Volume (Type A, Volume 1); 2-1, 2-2, 3-9, 3-10, 3-15, 4-1, 4-2, 4-3, 4-4, 5-8.

Troubleshooting/Repair Volume (Type A, Volume 2); 1-3, 1-9, 2-2, 3-11, 3-19.

2. New functions were added for certain keys (but the manual has not been updated). These include:

Shift A = Carriage Return  
Shift B = Line Feed  
Shift C = Letter Shift  
Shift D = Figure Shift  
Shift E = Blank

Affected pages:

Support Volume; 2-1, 2-2.  
Troubleshooting/Repair Volume; 3-19.

3. The MED automatically and appropriately starts new lines when transmitting to Service A. This function has been modified. The previous version looked for the first space after sixty characters in a line. The new version looks for the first space after sixty-four printable characters in a line. Affected pages:

Support Volume; 3-15.  
Troubleshooting/Repair Volume; 3-27, 3-33.

4. Test and check out procedures requiring revision.  
Affected pages:

Support Volume; 4-1, 4-2, 4-3, 4-4.  
Depot Repair Volume (Type B); 1-5, 1-6, 2-9, 2-10,  
2-11, 2-12, 3-9.

A. Instruction Material

1. MED Troubleshooting/Repair Volume (Type A, Volume 2), Pages 1-3 and 1-9, make the following pen-and-ink change. In the upper left corner of both pages, in the second decision diamond, change "LINES 4 & 5" to "LINES 3 & 4."

B. Schematics and/or Diagrams.

None.

Attachments  
Program Overview Page

## PROGRAM OVERVIEW

Upon power up, the MED program clears the display and displays "AMOS" in the upper left corner. If this is a RAMOS MED, line 3 is initialized to aviation format with all sensor data missing. Then the AMOS or RAMOS is polled for its message.

The MED now waits for one of five interrupts: Service A first character, Service A next character, Autocall timer, AMOS or RAMOS character, or Keyboard character.

A Service A first character interrupt causes the transmission pointer to be positioned at the start of line 1 (if validated) or line 3 (if not validated). A letter shift character is then transmitted.

A Service A next character interrupt causes the next character to be transmitted. This routine generates shift characters as needed. It automatically starts a new line when a line exceeds 64 characters. It compacts multiple spaces to a single space. If validated, it blanks out the "AMOS" in line 3.

An Autocall timer interrupt causes an update of the AMOS or RAMOS message only if the MED has not been validated.

An AMOS or RAMOS character interrupt causes a character fetch and a branch to the AMOS input subroutine or the RAMOS input subroutine.

The AMOS input subroutine processes characters received from an AMOS. Most characters are simply displayed, but some characters produce special actions. Letter shift and figure shift characters clear and set the case flip-flop respectively. If a space is received near the end of a line, a new line is begun.

The RAMOS input subroutine processes characters received from a RAMOS. It converts the ASCII data to BAUDOT and puts the data in aviation format. Voltage, current, and power failure data are displayed in the lower right corner of the display. If a space is received near the end of a line, a new line is begun.

The Keyboard character interrupt processes characters typed on the keyboard. Most characters are simply displayed, but some keys perform special functions. The Return Key advances the cursor to the beginning of the next line and erases that line. The four cursor movement keys move the cursor up, down, left, or right. Shift A produces a carriage return character. Similarly, Shift B produces a line feed, Shift C a letter shift, Shift D a figure shift, and Shift E a blank. The Sonalert (bell) is sounded when nearing the end of a line.



**U.S. DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
NATIONAL WEATHER SERVICE  
Silver Spring, Md. 20910

September 25, 1984 W/OTS141 - TEC

TO: All NWS Regional Headquarters, Area Electronics Supervisors,  
and Electronics Technicians (EHB-11 Distribution)

FROM: W/OTS1 - J. Michael St. Clair *J. M. St. Clair*

SUBJECT: Transmittal Memorandum Engineering Handbook No. 11, Issuance 84-7

1. Material Transmitted:

Engineering Handbook No. 11 - Automatic Observing Equipment, Section 3.4,  
MED Modification Note 3: Addition of two Insulation Jumpers to the RAMOS  
MED 1A3 Board.

2. Summary:

This modification adds 2 jumpers in parallel with the existing ground and  
+5 volt line, reducing the noise level, and correcting the problem with  
erroneous characters at the MED display.

3. Effect on Other Instructions:

None.

4. Certification Statement:

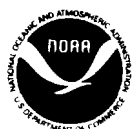
This modification has been successfully field tested for system  
operational integrity at National Reconditioning Center, Kansas City,  
Missouri.

5. Reporting Modification to WSH Engineering Division:

Target date for reporting completion of this modification is Dec. 04, 1984.

All completed equipment modifications shall be reported on the H-28 Form,  
Engineering Progress Report, in accordance with EHB-4, Part 2.

EHB-11  
Issuance 84- 7



MED MODIFICATION NOTE 3  
(for Electronics Technicians)

SUBJECT : Addition of two Insulated Jumpers to the RAMOS MED 1A3 Board.

PURPOSE : To reduce excessive noise causing erroneous random characters at the MED Display.

EQUIPMENT AFFECTED : All RAMOS MEDS.

PARTS REQUIRED : About 12 inches of No. 22 Stranded Insulated Wire.

MOD PROCUREMENT : Use existing stock of wire or purchase from local distributor such as Radio Shack.

SPECIAL TOOLS : Standard Complement.

TEST EQUIPMENT : Oscilloscope.

TIME REQUIRED : 1 Work Hour.

General: This modification, with the suggested replacement calibration procedure, will provide satisfactory performance if the telephone lines are within specifications. If the telephone signals are attenuated or noisy, it is recommended that the telephone company be contacted first. If the telephone company does not fix their lines, the el tech can raise the signal levels above the noise. These levels are adjusted in Steps 3 and 7 of the calibration procedure (or Steps 3 and 6 of the alternate procedure).

Procedure:

I. WIRE JUMPER ADDITION

- A. Steps 1 through 10 should be accomplished in completing this modification.
  1. Turn off power to the MED.
  2. Remove the 1A3 or 1A3A Board.

1A3

3. Solder Ground Jumper from P1-43 to a feed through near C5 on component side of board (see attached Drawing No. S090-A600-DR003A Rev D). Use epoxy or rubber cement to secure wire to prevent movement on front of board.
4. Solder +5 Volt Jumper from P1-1 to a feed through near Q3.
5. Replace 1A3 Board in socket.
6. Turn power back on to the MED.

1A3A

7. Solder Ground jumper from P1-43 to feed through near C5 on component side of board (see attached Drawing No S090-1A3A-SD002). Use epoxy or rubber cement to secure wire to prevent movement on front of board.
8. Solder +5 Volt Jumper from P1-1 to a feed through near U12.
9. Replace 1A3A Board in socket.
10. Turn power back on to the MED.

II. The procedures for both the one and two-technician methods for calibration will be found in MED Maintenance Note 2, Revision #1, dated July 30, 1984.

III. INSTRUCTION MANUAL CHANGES: None.

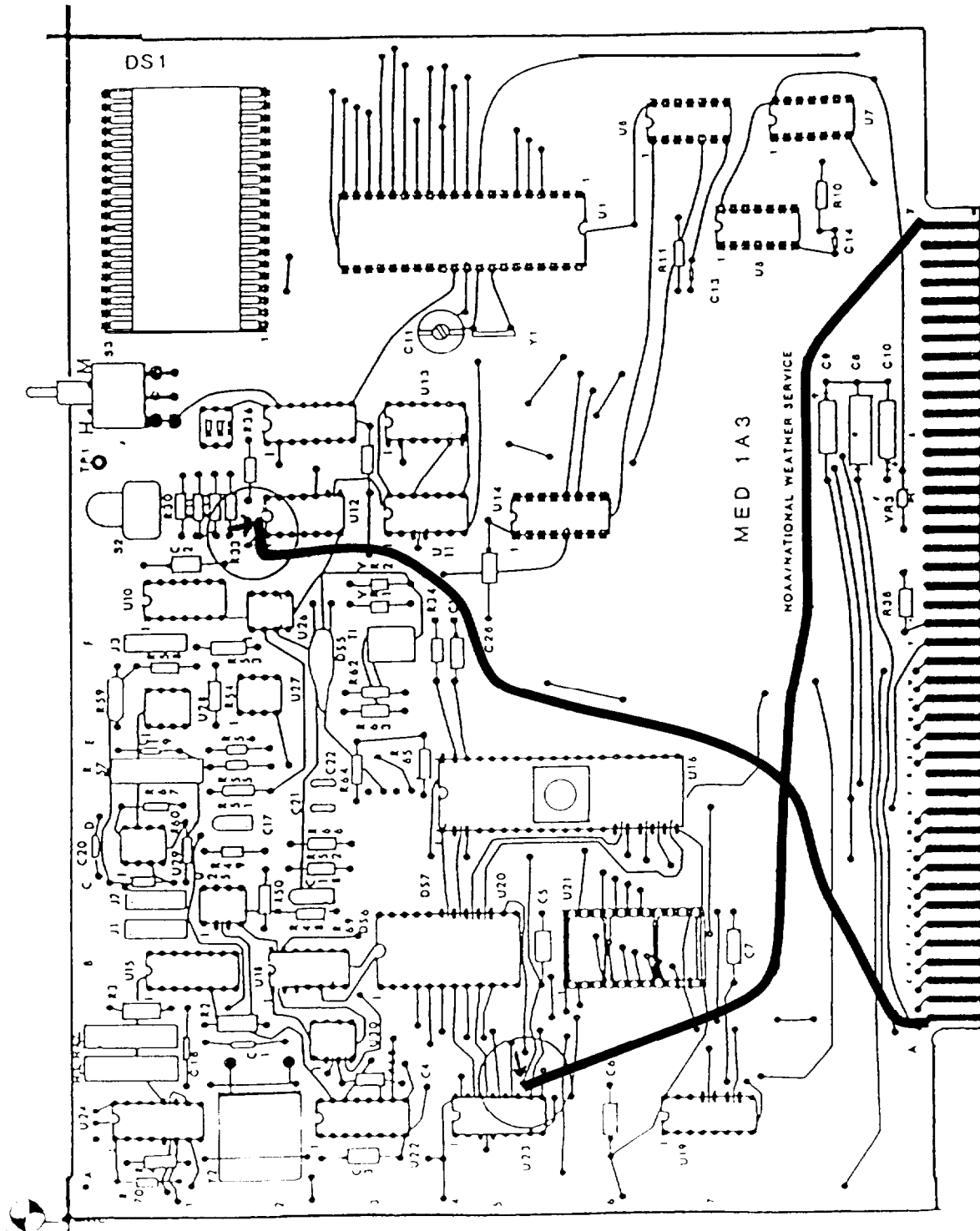
A. Schematic and/or Diagrams

1. S090-1A3A-SD002 RAMOS MED 1A3A Printed Wiring Board Assembly.
2. S090-A600-DR003A RAMOS MED Interface (RMI) Printed Wiring Board Drill Detail Drawing.

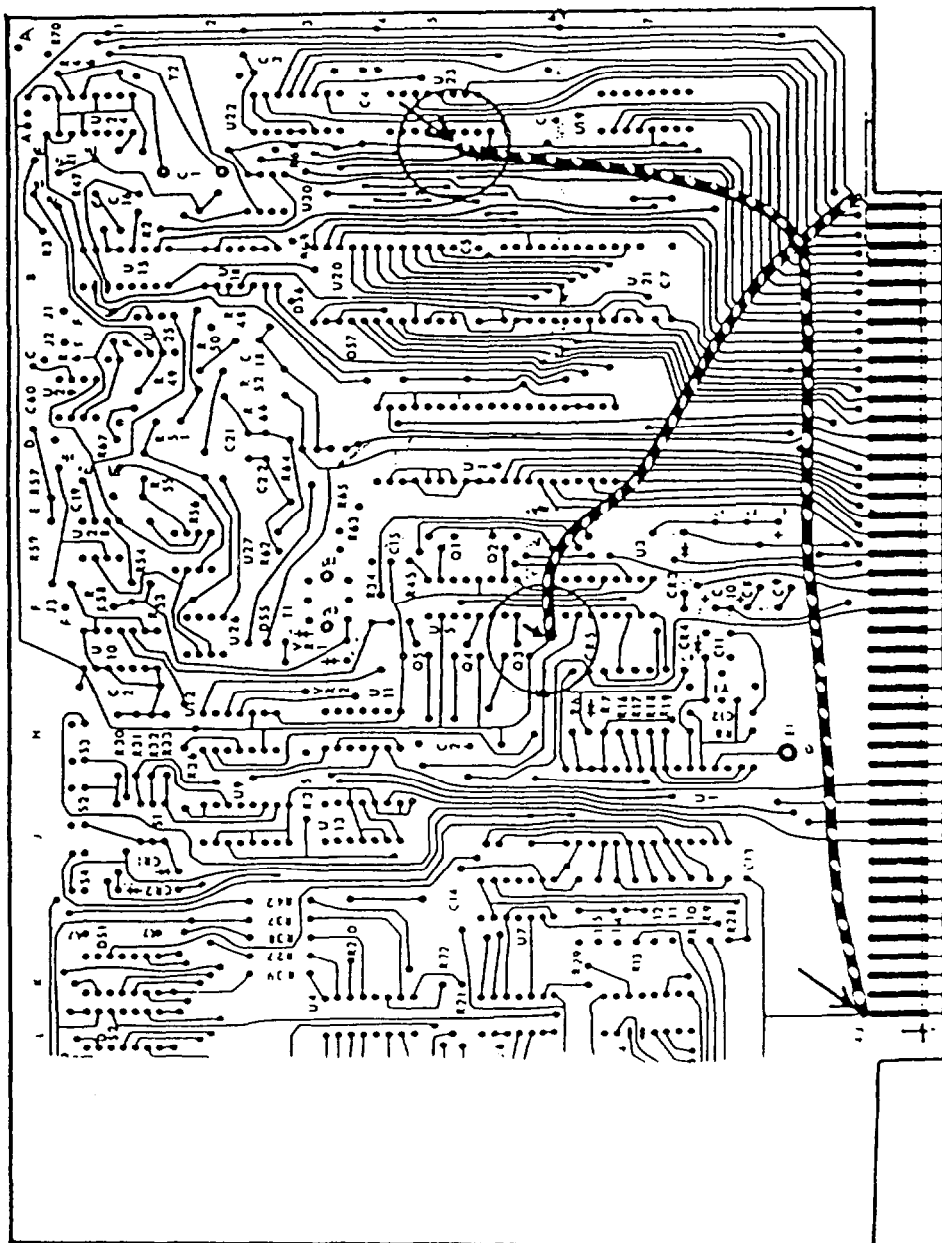
Attachments

1. 1A3A Board, 2 copies of drawing
  2. Partial 1A3 Board, 2 copies of drawing
- } per each Transmittal Memo.



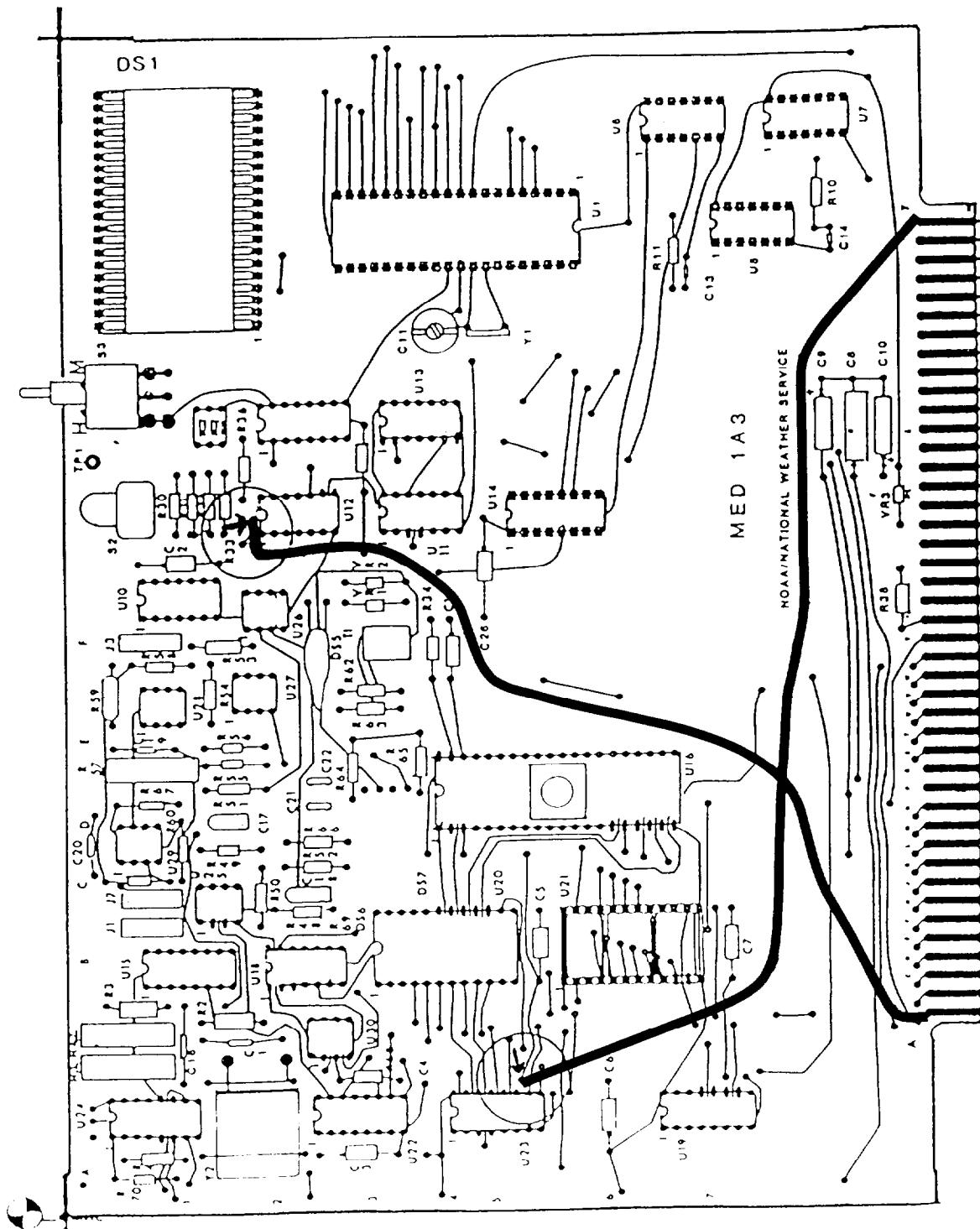


1A3A BOARD  
S090-1A3A-SD002



Partial 1A3 BOARD  
S090-A600-DR003A REV D

Attachment #2



1A3A BOARD  
S090-1A3A-S0002

Partial 1A3 BOARD  
S090-A600-DR003A REV D



**U.S. DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
NATIONAL WEATHER SERVICE  
Silver Spring, Md. 20910

W/OTS13 - RCA

TO: All NWS Regional Headquarters, Area Electronics Supervisors,  
and Electronics Technicians (EHB-11 Distribution)

FROM: W/OTS1 - J. Michael St. Clair *J. M. St. Clair*

SUBJECT: Transmittal Memorandum for Engineering Handbook No. 11, Issuance 85-

1. Material Transmitted:

Engineering Handbook No. 11, Automatic Observing Equipment, Section 3.4,  
Manual Entry Device, Modification Note 4: Conversion to RS232C  
Communications.

2. Summary:

Modification Note 4 provides instructions for converting the MED  
communications from Service A teletype loop (Baudot) to direct-dial  
telephone network (ASCII).

3. Effect on Other Instructions:

Inserts for MED Manuals (11-105) will be available through NLSC.

4. Certification Statement:

This modification has been tested for operational integrity by the  
Operational Systems Engineering Branch.

5. Reporting Modification to WSH Engineering Division:

Target date for completion of this modification is November 1, 1985

All completed equipment modifications shall be reported as instructed in  
EHB-4 Part 2 (Engineering Progress Report, WS Form H-28) within 28 days of  
completion.

EHB-11  
Issuance 85-



Engineering Division  
W/OTS13

MANUAL ENTRY DEVICE MODIFICATION NOTE 4  
(for Electronics Technicians)

SUBJECT : Conversion to RS232C Communications.

PURPOSE : To allow for data collection by the Centralized Automatic Data Acquisition System (CADAS) after the deactivation of Service A.

EQUIPMENT AFFECTED: MED's in all regions except Alaska and Pacific Regions.

PARTS REQUIRED :

- 1 - Shrinkable tubing, 1/16" x 1" long
- 6 - Hookup wires, 24" long, 1 each red, green, gray, yellow, brown, blue (#24 AWG)
- 4 - Hookup wires, 4" long, 1 each red, yellow green, orange (#24 AWG)
- 2 - Lockwasher, #4 external
- 2 - Machine screw, pan head, 4-40UNC-2A x 1/2"
- 2 - Machine screw, pan head, 4-40UNC-2A x 1/8"
- 5 - Cable ties, miniature
- 2 - S090-1A2A I/O Memory Clock Modem PCB and schematic
- 2 - S090-1A1U28 Character EPROM
- 2 - S090-1A1U29 Character EPROM
- 1 - S090-1W1 Modem cable
- 1 - Hayes Smartmodem 300, with manual and accessories
- 2 - Return mail labels

MOD PROCUREMENT : All parts will be shipped directly to affected stations by NWS Headquarters.

SPECIAL TOOLS : None  
REQUIRED

TEST EQUIPMENT : 110 baud terminal with modem (can be remote)  
REQUIRED

TIME REQUIRED : 6 work hours.

General:

The Service A teletype loop, which uses 75 baud Baudot code, is being deactivated. In order that MED data may continue to be collected, the MED's are being converted to direct-dial telephone network communications using 110 baud ASCII code. This modification includes: chassis wiring modifications, printed circuit board substitution, and modem installation. For AMOS-MED's, AMOS Modification No. 7 is also required.

Procedure:

1. Verify telephone line has been installed and is operating correctly.
2. Contact Mr. Elroy McLeod, W/OTS31, FTS or (301) 763-7400, and give him the station identifier and the telephone number. He will enter this data into the CADAS program. Within approximately 1 hour, CADAS will begin periodically calling your telephone. Wait until this happens before continuing with this procedure.
3. Consult MED Instruction Manual 11-105, Type A, Volume 1. Read the precautions concerning the Service A Teletype Loop found in Section 5-3 c(3), which begins on page 5-4.
4. After coordinating with FAA, the telephone company, and your MIC/OIC, turn off MED power and disconnect the MED from Service A.
5. Tag and disconnect remaining cables and move MED to a suitable work area. Remove the top access cover and the 1A1, 1A2, and 1A3 printed circuit boards (PCB's) and set them aside.
6. Consult MED Instruction Manual 11-105, Type A, Volume 2. Page 4-19 is an assembly drawing which should prove helpful.
7. Remove the mounting nuts of TB101. Unsolder the eight wires connected to TB101 and set TB101 aside.
8. Place the MED on its back with its bottom toward you. Remove the bottom access cover.
9. Remove the four 1/4" hex nuts and washers supporting the 1A9 PCB.
10. Carefully lift the 1A9 PCB, which will be removed in this procedure. Remove the cable ties to provide maximum access to the terminals of the 1A9 PCB.

11. Figure 1 is provided to show location of the 1A9 PCB terminals. Locate the #18 AWG black wire which runs between ground stud E101 and 1A9E9. Carefully clip this wire at the 1A9 end. This will allow even better access to the 1A9 PCB. Pass the loose end of the wire through the hole in the chassis for TB101.
12. Locate the R18 AWG black wire which runs between the power supply and 1A9E15. Clip this wire at the 1A9 end and pass the loose end through the hole in the chassis for TB101.
13. Locate the #24 AWG brown wire which runs between the power supply and 1A9E14. Clip this wire at the 1A9 end and insulate the loose end with the shrinkable tubing provided.
14. Locate the following #24 AWG wires and remove them completely:
  - 1A9E13 to J102-9 (gray)
  - 1A9E12 to J102-D (yellow)
  - 1A9E11 to J102-6 (yellow)
  - 1A9E10 to J102-E (red)

The 1A9 PCB should now be completely disconnected. Remove the loose wires from the 1A9 PCB and set it aside. Save the #18 AWG black wire for use later in this procedure.

15. Attach (solder) the four, 4", #24 AWG jumper wires provided as follows:

J102-B	red	J103-14	(ASCII Tone)
J102-D	yellow	J103-15	(ASCII Tone)
J102-30	green	J103-22	(Battery)
J102-p	orange	J103-Z	(+12 VDC)
16. Attach (solder) the six, 24", #24 AWG wires provided as follows:

J102-6	red
J102-9	green
J102-E	gray
J102-41	yellow
J102-42	brown
J102-40	blue

Route these wires through the cable clamp to the left of J102 and out through the hole in the chassis for TB101.



17. Eight wires should now have been passed through the hole in the chassis for TB101: one from step 11, one from step 12, and six from step 16. Rotate the chassis to provide access to the ends of these wires.
18. Clip any excess wire length so that about a four inch length of wire protrudes from the hole. Solder the wires to TB101 as follows:

TB101-1	brown wire from J102-42
TB101-2	red wire from J102-6
TB101-3	black wire from EI01 (gnd stud)
TB101-4	yellow wire from J102-41
TB101-5	green wire from J102-9
TB101-6	blue wire from J102-40
TB101-7	black wire from power supply
TB101-8	gray wire from J102-E

Using the #18 AWG black wire, saved in step 14, connect TB101-3 to TB101-7.

19. Install TB101 to the chassis, replacing the 1A9 mounting stud and long screw with the screws and lockwasher provided. Similarly, replace mounting stud and long screw on TB102 at this time.
20. Use the five cable ties provided to rebundle the wires. Replace the bottom access cover.
21. Set the MED chassis upright. If your MED has a 9 volt battery and bracket, then you must change it back to the original 4.2 volt battery and bracket. Please contact Rick Ahlberg at (301) or FTS 427-7842 so he can include the 4.2 volt bracket with your modification kit. NOTE: The 9 volt battery was used on a few RAMOS MED's. It powered the LCD clock circuit on the 1A3A PCB, which was a limited issue replacement for the 1A3 PCB.
22. Position the jumpers on the new 1A2A PCB. Set the W1 jumper on the 1A2A PCB to AMOS or RAMOS as appropriate. (The W2 jumper should be in the 2K position.) Install the 1A2A PCB into J102. (The new 1A2A replaces both the 1A2 and the 1A3 PCB's.)
23. Replace the character generator EPROM's (U28 & U29) on the 1A1 PCB with those provided and install the 1A1 PCB into J101.
24. Repeat step 23 for the spare 1A1 PCB.

25. Move MED back to its operational location and reconnect cables removed in step 5. If this is an AMOS MED, perform AMOS Modification #7 at this time.
26. Verify operation using procedure on attached MED Instruction Manual 11-105, Type A, Volume 1, new pages 4-7 through 4-10.
27. Connect the modem RS232C cable to TB101:

TB101-5	red wire	- pin 3	received data
TB101-6	green wire	- pin 2	transmitted data
TB101-7	black wire	- pin 7	signal ground
TB101-8	white wire	- pin 8	carrier detect
28. Install the modem, referring to Chapters 2 and 8 of the modem manual. The configuration switches should be positioned as follows:

Switches 3, 5, 6, and 7 up;
Switches 1 and 4 down;
Switches 2 and 8 either position.
29. Turn power on to modem first. Then turn power on to MED.  
NOTE: Power may be applied to both at the same time, but, if power is applied to the MED first, the telephone line disconnect features may not work.
30. Enter a test message via the MED keyboard, indicating that this is a test of the installation. Depress the VALIDATE key to cause the test message to be transmitted upon interrogation.
31. Using another telephone and a 110 baud terminal and modem call the MED telephone number. Wait until the communications link has been established.
32. Type a capital O on the terminal, and the MED should transmit its message.
33. Type an ESCAPE on the terminal, and the MED should break the communications link (hang up) after a few seconds.
34. Repeat step 31 to reestablish the communications link.
35. Type a shift X on the MED, and the MED should transmit its message.

36. Type a shift Z on the MED, and the MED should break the communications link (hang up) after a few seconds.
37. Repeat step 31 to reestablish the communications link.
38. Verify that the MED breaks the communications link (hangs up) after one to two minutes of no activity on both the terminal and the MED.
39. Turn off modem and MED power.
40. Substitute spare PCB's and repeat steps 29 through 38.
41. (RAMOS MED Only) The RAMOS, in its current configuration, transmits the letter "O" at the beginning of its message. The "O" is displayed on the MED. You may have noticed it in steps 26, 32, or 35. This "O" is not desired operationally, so you must install the XMT5 jumper on the RAMOS ZI card. This jumper will change the letter "O" to an underline character (which the MED ignores). After installing the XMT5 jumper, verify that the "O" no longer appears on the MED.
42. If the MED has functioned properly, replace the top access cover, set the clock (see MED Program Features) and declare the MED operational. If you encounter difficulties, seek help from: first, your AES; second, your regional electronics branch specialist; third your NWSH Engineering Division (Mr. Rick Ahlberg - FTS or (301) 427-7842).

This completes the modification.

#### Disposition of Removed Parts:

The following removed parts and spares are to be returned using the provided pre-addressed label:

S090-1A2 I/O Memory PCB's

S090-1A3 or S090-1A3A RAMOS Interface PCB's

S090-1A9 TTY Interface PCB's

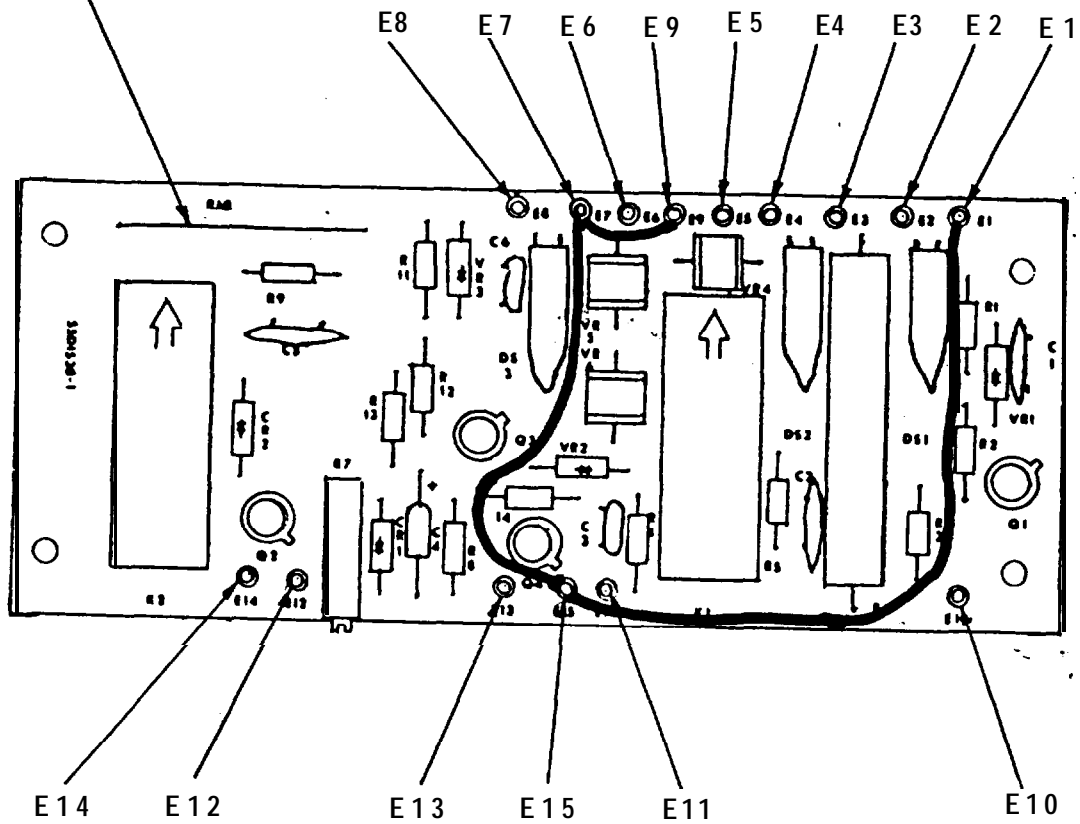
Please pack the second return address label inside the box, and identify the station(s) which the parts are from. Fill out the return receipt so that you will get confirmation that the parts were received.

Instruction Manual Changes:

Inserts for the MED Instruction Manual, Type A, Volumes 1 & 2 will be provided at a later date. Stations and regional offices will be notified when the inserts are available.

Attachments: Figure 1 - MED 1A9 Terminal Locations  
MED Instruction Manual 11-105, Type A, Volume 1,  
new pages 4-7 through 4-10.  
MED Program Features - 7/9/85  
WS Form H-28 - Engineering Progress Report

(RESISTOR R10 REPLACED WITH JUMPER WIRE IN MED MODIFICATION NOTE NO. 1 )



1A9 MED-AMOS PWB PARTS LOCATION

FIGURE 1

TABLE 4-4.

## AMOS-MED (ASCII TYPE) PERFORMANCE CHECK

Step	Action	Acceptance Criteria
1	Set MED Power Switch to ON position.	a. AMOS displayed on line 1 of display. b. Lines 2, 5, 6, 7, and 8 of display blank. (Real-time clock is displayed at end of line 8.) c. AMOS data is entered on lines 3 and 4 of display. d. VALIDATED LED is not illuminated.
2	Enter "CHECKOUT" Via Keyboard	The work CHECKOUT appears on display behind cursor.
3	Depress DATA UPDATE Key	Lines 3 and 4 of display blank and refill with AMOS data.
4	Depress and hold Keyboard SHIFT Key while depressing the "W" Key. Observe display.	Every 60 seconds, lines 3 and 4 of display blank and refill with AMOS data and clock updates.
5	Depress VALIDATE Key	VALIDATED LED lights.
6	Observe Display for 1 minute	AMOS data (lines 3 and 4) of display do not change (no update).
7	Depress and hold the Keyboard SHIFT Key while depressing the "X" key	MED display contents are transmitted to the modem (display may flicker during transmission).
8	Depress VALIDATE Key	VALIDATED LED lights.
9	Depress RESET Pushbutton	a. Display cleared except for AMOS on line 1 and clock on line 8. b. AMOS data enters on lines 3 and 4 of display. c. MED sonalert gives a short "beep." d. VALIDATED LED extinguished.
10	Enter "1234567890-+QWERTYUIO" from Keyboard	Characters appear on line 1 of display behind cursor.
11	Enter "P" from Keyboard	a. Short "beep" heard from MED Son-alert. b. The letter P is added to line 1 of display.

TABLE 4-4.  
AMOS-MED (ASCII TYPE) PERFORMANCE CHECK

Step	Action	Acceptance Criteria
12	Depress RETURN Key on Keyboard	Cursor moves to beginning of next line.
13	Enter "ASDFGHJKLZXCVBNM/" from Keyboard	Characters appear on line 2 of display behind cursor.
14	Depress and hold the Keyboard SHIFT Key while depressing the following keys.  A B C D E F G or 1 H or 6 I or 7 J K L M N O P Q R S T V Y	Characters appear on display behind cursor.  & ampersand • special blank (centered dot) : colon \$ dollar sign = equal sign LF line feed > greater than ( left parenthesis ) right parenthesis ' apostrophe , comma < less than * asterisk # number sign ! exclamation point % percent sign " double quote CR carriage return ; semi colon @ at sign special space ? question mark
15	Depress and hold the Keyboard SHIFT Key while depressing the following keys.  U X Z	Function occurs.  Unvalidate (LED extinguished) Forced transmission Forced hangup sequence
16	Depress each of the four red cursor control (arrow) keys.	Cursor moves as indicated by arrow.

TABLE 4-5.

## RAMOS-MED (ASCII TYPE) PERFORMANCE CHECK

Step	Action	Acceptance Criteria
1	Set MED POWER Switch to ON position.	a. AMOS displayed on line 1 of display. b. Lines 2, 5, 6, and 7 of display blank. c. RAMOS data is entered on lines 3, 4, and 8 of display. (Real-time clock is displayed at end of line 8.) d. VALIDATED LED is not illuminated.
2	ENTER "CHECKOUT" via Keyboard	The word CHECKOUT appears on display behind cursor.
3	Depress DATA UPDATE Key	Lines 3, 4, and end of 8 of display blank and refill with RAMOS data.
4	Depress and hold the Keyboard SHIFT Key while depressing the "W" Key. Observe display	Every 60 seconds, lines 3, 4, and end of 8 of display blank and refill with RAMOS data and clock updates.
5	Depress VALIDATE Key	VALIDATED LED lights.
6	Observe Display for 2 minutes	RAMOS data (lines 3, 4, and end 8) of display do not change (no update).
7	Depress and hold the Keyboard SHIFT Key while depressing the "X" Key	MED display contents are transmitted to the modem (display may flicker during transmission).
8	Depress VALIDATE Key	VALIDATED LED lights.
9	Depress RESET Pushbutton	a. Display cleared except for AMOS on line 1 and clock on line 8. b. RAMOS data enters on lines 3, 4, and end of 8 of display (MED translates RAMOS data to AMOS format). c. MED sonalert gives a short "beep." d. VALIDATED LED extinguished.
10	Enter "1234567890-+QWERTYUIO" from Keyboard	Characters appear on line 1 of display behind cursor.
11	Enter "P" from Keyboard	a. Short "beep" heard from MED Son-alert. b. The letter P is added to line 1 of display.



TABLE 4-5.

## RAMOS-MED (ASCII TYPE) PERFORMANCE CHECK

Step	Action	Acceptance Criteria
12	Depress RETURN Key on Keyboard	Cursor moves to beginning of next line.
13	Enter "ASDFGHJKLZXCVBNM/" from Keyboard	Characters appear on line 2 of display behind cursor.
14	Depress and hold the Keyboard SHIFT Key while depressing the following keys.	Characters appear on display behind cursor.
	A	& ampersand
	B	• special blank (centered dot)
	C	: colon
	D	\$ dollar sign
	E	= equal sign
	F	LF line feed
	G or 1	> greater than
	H or 6	( left parenthesis
	I or 7	) right parenthesis
	J	! apostrophe
	K	, comma
	L	< less than
	M	* asterisk
	N	# number sign
	O	! exclamation point
	P	% percent sign
	Q	" double quote
	R	CR carriage return
	S	; semi colon
	T	@ at sign
	V	special space
	Y	? question mark
15	Depress and hold the Keyboard SHIFT Key while depressing the following keys.	Function occurs.
	U	Unval i date (LED extingui shed)
	X	Forced transmi ssi on
	Z	Forced hangup sequence
16	Depress each of the four red cursor control (arrow) keys.	Cursor moves as indicated by arrow.

## MED Program Features - 7/9/85

The Manual Entry Device (MED) is used to provide the interface between the AMOS or RAMOS and the Centralized Automatic Data Acquisition System (CADAS). The MED performs the following major functions:

- (1) Interrogates the AMOS/RAMOS and receives and displays data from the AMOS/RAMOS.
- (2) Displays observer comments entered via the keyboard.
- (3) Transmits the displayed data with or without comments to the CADAS via the direct dial telephone network.

The MED display is 8 lines of 32 characters. The first 6 characters on the first line are reserved for the word "AMOS." The third and fourth lines are reserved for the AMOS/RAMOS data. The last 4 characters on the eighth (last) line are reserved for display of the real-time clock (hours and minutes). In RAMOS mode only, the 6 characters to the left of the real-time clock display are reserved for maintenance data consisting of the power failure indicator (Z) and the battery voltage (V270).

Each time the AMOS/RAMOS is interrogated the MED rewrites the word "AMOS" and erases lines 3 and 4. In RAMOS mode the maintenance data area on line 8 is erased also.

The real-time clock (RTC) will not run when first powered up; that is, when either AC power is first applied or batteries are first installed. In this case the initial display of the RTC will be "3?7?." Once set, the RTC will run as long as either MED AC power is on or good batteries are in place.

To set the RTC, enter the desired value into the last 4 characters of line 8, then key SHIFT W. Non-numeric entries to the RTC are converted to numeric entries; that is, letters are converted to numbers.

Each time the RTC display is updated, time is checked to determine if the validation or error flags should be cleared. Validation is cleared at 5, 25, and 45 minutes after the hour. The one hour error flag is cleared at 5 minutes after the hour (and the peak wind reset is sent to the RAMOS). The six hour error flag is cleared at 0005, 0605, 1205, and 1805 (and the precipitation reset is sent to the RAMOS).

MED messages are transmitted to CADAS through a Hayes Smartmodem 300 in ASCII at 110 baud. An unvalidated message will consist of the first six characters of line 1 ("AMOS") and lines 3 and 4. A validated AMOS message will consist of the whole display except the last 4 characters on line 8 (RTC). A validated RAMOS message will consist of the whole display except the last 10 characters on line 8 (maintenance data and RTC).

A character counter keeps track of characters transmitted. The MED inserts a carriage return and line feed at the first space after the 64th printable character (and resets the character counter).

Upon power up the MED program:

- Sets the 1 Hr and 6 Hr error flags,
- Sounds the sonalert (bell),
- Clears the keyboard and validation,
- Erases the entire display,
- Initializes the modem to 110 baud,
- Writes the word "AMOS",
- Interrogates the AMOS/RAMOS,
- Displays the real-time clock,
- Clears the one-minute interrupt timer, and
- Displays the cursor at the 7th character of the 1st line.

The program then awaits an interrupt:

- AMOS/RAMOS character received,
- Keyboard character entered,
- Modem character received,
- Modem carrier detected, or
- One-minute timer interrupt.

(While transmitting a message or hanging up, MED responds to AMOS/RAMOS character received interrupt only. All other interrupts are suspended.)

AMOS/RAMOS character received interrupt: characters are displayed starting on line 3 and continuing on subsequent lines as needed. (A new line will be started at the first space after the 26th character on a line.) RAMOS messages are encoded into aviation format: extra parameters are displayed as remarks in the order received.

Keyboard character entered interrupt: pressing a key on the keyboard will produce one of several responses described below. The one-minute timer is reset and restarted after each response.

In most cases, a character will be displayed at the cursor location and the cursor will be moved one character to the right. The cursor skips over lines 3 and 4; that is it moves from the last character of line 2 to the first character of line 5. The following table lists the characters displayed when using the SHIFT key:

A	&
B	NUL (centered dot)
C	:
D	\$
E	=
F	LF (line feed)
G or 1	>
H or 6	(
I or 7	)
J	'
K	,
L	<
M	*
N	#
O	!
P	%
Q	"
R	CR (carriage return)
S	;
T	@
Y	?
V	SS (special space used for RAMOS processing)

In some cases a function will be performed:

Cursor movement	-- left, right, up, down
DATA UPDATE	interrogates AMOS/RAMOS (if MED is not validated),
RETURN	skips to next line, erase that line leaving cursor at start of line. Lines 3 and 4 are skipped over.
VALIDATE	validates message and lights LED indicator.
SHIFT U	unvalidates message and extinguishes LED indicator.
SHIFT W	sets (and starts) the real-time clock.
SHIFT X	transmits the MED message.
SHIFT Z	disconnects (hangs up) the telephone.

Modem character received interrupt: the MED responds to two characters received from the modem (over the phone line): the letter 0 causes the message to be transmitted; the ESCAPE code forces the MED to disconnect the phone line.

Modem carrier detected interrupt: this occurs when someone or something calls the MED via telephone and establishes a carrier link. The one-minute timer is reset and restarted.

One-minute timer interrupt: The program checks for the modem carrier. If there is a carrier, then an automatic disconnect occurs. If there is no carrier, then the AMOS/RAMOS is interrogated (if the MED is not validated). In either case the real-time clock display is updated.

To summarize,

The AMOS/RAMOS is interrogated (if the MED is not validated):

- (1) Upon power up,
- (2) When DATA UPDATE is pressed, or
- (3) Automatically once a minute (when there is no carrier and there is no keyboard action).

The real-time clock is updated:

- (1) In the above situations,
- (2) Upon completion of a hang-up, or
- (3) Upon completion of a message transmission.

The one-minute timer interrupt is reset and restarted:

- (1) In the above situations,
- (2) When setting (and starting) the real-time clock,
- (3) After any keyboard entry, or
- (4) Upon detection of the establishing of the modem carrier.



**U.S. DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
NATIONAL WEATHER SERVICE  
Silver Spring, Md. 20910

W/OTS13: RCA

March 6, 1986

TO: All NWS Regional Headquarters, Area Electronics Supervisors, and  
Electronics Technicians (EHB-11 Distribution)

FROM: J. Michael St. Clair *J. M. St. Clair*  
Chief, Engineering Division

SUBJECT: Transmittal Memorandum for Engineering Handbook No. 11, Issuance 86-1,

1. Material Transmitted:

Engineering Handbook No. 11, Automatic Observing Equipment, Section 3.4,  
Manual Entry Device, Modification Note 5: Activation of RAMOS Resets.

2. Summary:

Modification Note 5 provides instructions for correcting a problem  
discovered after MED Modification No. 4, Conversion to RS232C  
Communications, was implemented. Signals that reset the peak wind and  
precipitation accumulation, which were not being acknowledged by RAMOS  
will now be acknowledged. We thank Rod Theis of Pendleton, Oregon, for  
reporting the problem.

3. Effect on Other Instructions

Inserts for MED Manuals (11-105) will be available through NLSC and will  
cover both modifications 4 and 5.

4. Certification Statement:

This modification has been tested for operational integrity by the  
Operational Systems Engineering Branch and field checked at Pendleton,  
Oregon.

5. Reporting Modification to WSH Engineering Division:

Target date for completion of this modification is March 31, 1986.

All completed equipment modifications shall be reported on the Form H-28  
(see attached exhibit), Engineering Progress Report, according to  
instructions contained in EHB-4, Part 2.

EHB-11  
Issuance 86-1



MANUAL ENTRY DEVICE MODIFICATION NOTE 5  
(For Electronics Technicians)

SUBJECT : Activation of RAMOS Resets

PURPOSE : To allow previously unacknowledged RAMOS reset signals to be acknowledged. The RAMOS peak wind and precipitation accumulation always will be reset at the proper times.

EQUIPMENT AFFECTED : MED's in all regions except Alaska and Pacific Regions; that is, all MED's which embraced MED Modification Note 4.

PARTS REQUIRED : 2 - EPROMs, labeled MED U18, 1/21/86

MOD PROCUREMENT : All parts will be shipped directly to affected stations by NWS Headquarters.

SPECIAL TOOLS : None.

REQUIRED

TEST EQUIPMENT : None.

REQUIRED

TIME REQUIRED : 1 Work Hour

General :

The not validated (unattended) MED does not reset the RAMOS peak wind or precipitation accumulation. This is because the current, 7/19/85 version of the MED program (Modification Note 4) transmits the reset character(s) at the same time the RAMOS is transmitting its data to the MED. As the RAMOS is half-duplex, it cannot and does not receive the reset character(s) sent to it by the MED. The problem is not observed when the MED is validated, as the MED is prevented from interrogating the RAMOS. The new, 1/21/86 version of the MED program (Modification Note 5) corrects the problem by sending the reset character(s) before the interrogation character, instead of after it.

There are other, minor functional changes as a result of this modification, which occur in both AMOS and RAMOS MED's. The 7/19/85 program caused a one minute delay in the automatic updating of the AMOS/RAMOS data in the following cases:

1. upon cancellation of the validation at 5, 25, and 45 minutes past the hour;
2. upon completion of a (not validated) MED transmission; and
3. upon completion of a (not validated) MED telephone disconnect.

In the 1/21/86 program, the 1 minute delay has been eliminated.

Procedure:

1. Turn off MED power and remove the top access cover.
2. Remove the 1A2A printed circuit board (PCB) and replace the EPROM (U18) with the new part provided. Note the serial number (85XX) on the 1A2A PCB.
3. Similarly, replace the EPROM on the spare 1A2A PCB, noting its serial number.
4. Install the 1A2A PCB in the MED and replace the top access cover.
5. Turn on MED power and verify operation. Consult MED Modification Note 4 for details, if necessary. Don't forget to set the clock!

This completes the modification.

Disposition of Removed Parts:

The removed EPROM's are to be returned using the provided pre-addressed label. Please complete the provided return form and include it with the EPROM's. Return the EPROM's promptly as other stations may be waiting for EPROM's. (As we only have about 1/3 of the EPROM's to modify all 100 PCBs, we are counting on using the returned EPROM's to complete the modification. Generally, EPROM's will be mailed to RAMOS MED sites first.)

Issue Date	Org. Code
2-5-92	W/OS032

# NATIONAL WEATHER SERVICE

## Engineering Handbook

Program	Part	Section
EHB-11	04	4.0

PART 4

AUTOMATIC OBSERVING (EHB-11)

4. Equipment Maintenance Schedules. Experience in the operation of electronic equipment has well established that reliable service and accurate data can be obtained only by the application of suitable routine maintenance procedures. Maintenance schedules are prepared for the guidance of electronics technicians and operating personnel, and comprise the minimum periodic checking and servicing considered necessary to assure dependable operation. Checks intended for operating personnel are limited to routine functions that have been identified as those that could ordinarily be observed during the course of normal operation of the equipment. These functions are usually consolidated at the beginning of each maintenance schedule for ease of use, with the remaining sections devoted to the electronics technician functions. The operator functions and electronics technician functions have been printed on contrasting colored pages for ready identification.

Maintenance schedules are prepared with the view of being as complete as possible. Some checks specified are critical as regards calibration and sustained reliable operation. Others fall in a less critical category, and depending upon the technician's workload, can be deferred until later. This criterion is, therefore, the basis for establishing priority maintenance. Priorities indicated on maintenance schedules are to be interpreted as follows:

Priority 1 - This check is important to sustained system operation or calibration and should be performed on schedule.

Priority 2 - This check or operation can be omitted until next scheduled period of maintenance.

Once sufficient familiarity with a system has been obtained, schedules are prepared by the NWS Office of Systems Operations Engineering Division. Tentative schedules are prepared for new equipment. These are then distributed to all electronics technicians and to those stations having that particular equipment. The effectiveness of the schedule is then monitored through the Engineering Management Reporting System (EMRS). Reports of component failures and system reliability then form the basis for any required revision found necessary. Maintenance schedules form an important aspect of the maintenance program and have a significant effect upon the establishment of workload standards and the development of various staffing and dispersion criteria.

As a technician's equipment responsibility periodically changes, he/she should ensure that copies of all available maintenance schedules are on hand for ready reference. Copies of missing schedules should be requested from the NLSC.



<i>Issue Date</i>	<i>Org. Code</i>
2-5-92	W/OS032

# NATIONAL WEATHER SERVICE

## Engineering Handbook

<i>Program</i>	<i>Part</i>	<i>Section</i>
EHB-11	04	4.1

### MAINTENANCE SCHEDULE INDEX - AUTOB

Date of Issue

Title

July 25, 1980

Maintenance Schedule for AUTOB Systems



**U.S. DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
NATIONAL WEATHER SERVICE  
Silver Spring, Md. 20910

W514

June 18, 1976

SUBJECT: Transmittal Memorandum for Engineering Handbook No. 11, Issuance 76-3

TO : All Regional Headquarters, Electronics Program Officers, and Electronics Technicians

1. Material Transmitted:

Engineering Handbook No. 11 - Automatic Observing Equipment, Section 4.1; Maintenance Schedule for the AMOS III-73 Systems.

2. Summary:

This maintenance schedule has been prepared for the use of all personnel in the operation and maintenance of the AMOS III-73 Systems. It comprises the minimum periodic checking and servicing considered necessary to assure dependable operation. If local conditions warrant it, more frequent checks should be made. One copy of the Meteorological Technician's part of the schedule should be detached and given to the station MIC/HIC/OIC to be inserted in the Station Duty Manual (SDM), Volume II. The Meteorological and Electronics Technicians' functions have been printed on contrasting colored pages for ready identification.

3. Effect on Other Instructions:

This issuance supersedes "The Interim Maintenance Schedule for the AMOS III-70, " and should be used in its place.

Merritt N. Techter  
Associate Director, Technical Services, W5

EHB-11  
Issuance 76- 3



U.S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL WEATHER SERVICE  
SILVER SPRING, MD. 20910

April 30, 1976

Office of Technical Services

W514

MAINTENANCE SCHEDULE FOR THE AMOS III-73 SYSTEMS  
(FOR METEOROLOGICAL TECHNICIAN)

DAILY		
What to Check	How to Check	Precautions & Remarks
1. Teletype Copy	Check for garbling or incorrect AMOS transmission. Switch printers or TD's to correct any garbling.	Notify FAA technician on teletype trouble and WS ELTEC on AMOS trouble.
2. Manual Input Device (Where applicable)	Check all controls for proper operation. Manual input portion of message shall be transmitted exactly as set on the rotary switches.	Note message coded on rotary switches must be validated during 5-minute window prior to AMOS interrogation.
WEEKLY		
1. Temperature and Dew Point	Compare temperature and dew point observed at the instrument shelter with those transmitted by AMOS.	Limits are $\pm 2^{\circ}\text{F}$ . for comparison checks at a site remote from AMOS thermal shield and $1.5^{\circ}\text{F}$ . for checks made at thermal shield site.
2. Precipitation	Check that accumulator clears after six hourly observation. Confirm that correct precipitation is transmitted .	Notify ELTEC if accumulator is not reset. Restart timer.

EHB-11  
Issuance 76-3

## WEEKLY

What to Check	How to Check	Precautions & Remarks
3. Altimeter Setting Indicator	Check that transmitted value agrees with the indicated altimeter setting to within $\pm 0.04''$ Hg.	(Use mercurial or precision aneroid for comparison checks.) Notify ELTEC if indicated and transmitted values are different.
4. Wind Speed and Direction	Observe wind speed and direction to insure they agree with transmitted values.	Notify ELTEC if wind speed error is greater than $\pm 4$ knots, or wind direction error is greater than $\pm 10^\circ$ . (Measurement of wind data must be longer than one minute of duration for comparison.)

U. S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL WEATHER SERVICE  
SILVER SPRING, MD. 20910

April 30, 1976

Office of Technical Services

W514

MAINTENANCE SCHEDULE FOR THE AMOS III-73 SYSTEMS  
(FOR METEOROLOGICAL TECHNICIAN)

DAILY		
What to Check	How to Check	Precautions &, Remarks
1. Teletype Copy	Check for garbling or incorrect AMOS transmission. Switch printers or TD's to correct any garbling.	Notify FAA technician on teletype trouble and WS ELTEC on AMOS trouble.
2. Manual Input Device (Where applicable)	Check all controls for proper operation. Manual input portion of message shall be transmitted exactly as set on the rotary switches.	Note message coded on rotary switches must be validated during 5-minute window prior to AMOS interrogation.
WEEKLY		
1. Temperature and Dew Point	Compare temperature and dew point observed at the instrument shelter with those transmitted by AMOS.	Limits are $\pm 2^{\circ}\text{F}$ . for comparison checks at a site remote from AMOS thermal shield and $1.5^{\circ}\text{F}$ . for checks made at thermal shield site.
2. Precipitation	Check that accumulator clears after six hourly observation. Confirm that correct precipitation is transmitted.	Notify ELTEC if accumulator is not reset. Restart timer.

EHB-11  
Issuance 76-3

## WEEKLY

What to Check	How to Check	Precautions &, Remarks
3. Altimeter Setting Indicator	Check that transmitted value agrees with the indicated altimeter setting to within $\pm 0.04''$ Hg.	(Use mercurial or precision aneroid for comparison checks.) Notify ELTEC if indicated and transmitted values are different.
4. Wind Speed and Direction	Observe wind speed and direction to insure they agree with transmitted values.	Notify ELTEC if wind speed error is greater than $\pm 4$ knots, or wind direction error is greater than $\pm 10^\circ$ . (Measurement of wind data must be longer than one minute of duration for comparison.)

U.S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL WEATHER SERVICE  
SILVER SPRING, MD. 20910

Office of Technical Services  
Engineering Division

April 30, 1976  
W514

MAINTENANCE SCHEDULE FOR THE AMOS III-73 SYSTEMS  
(FOR ELECTRONICS TECHNICIAN)

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QUARTERLY

What to Check	How to Check	Precautions & Remarks
1. Teletype Copy	Check for garbling or incorrect AMOS transmission. Switch printers, if possible.	
2. Dewcell Bobbin	Replace with spare processed bobbin.	It is imperative that the dewcell bobbins be kept in their containers with the desiccant when not powered up.

NOTE: The requirement for maintenance of the dewcell bobbins is scheduled for quarterly maintenance, but is flexible. The maintenance interval should be adjusted as required for individual stations.

The optimum period for processing the dewcell bobbin in the AMOS III-73 will vary with the environment. The bobbin should be replaced when the dewpoint reading is suspected of being in error in comparison with a sling psychrometer (or equivalent).

These bobbins must be carefully washed. Familiarity with Maintenance Notes 16 and 17 in the EHB-8, H061, Section 2.5, is a necessity in caring for dewcells. After washing the bobbin, saturate it with the lithium chloride solution and dry it in an oven 150°F for one hour. Upon removing it from the oven, immediately place the bobbin in its plastic container with the desiccant. The bobbin should be kept in its container until ready for use. Contamination of the bobbin will render it useless.

EH B-1 1  
Issuance 76- 3

SEMIANNUAL		
What to Check	How to Check	Precautions & Remarks
1. Precipitation	<p>Inspect tipping bucket rain gage. Check accumulator by operating tipping bucket and comparing teletype copy.</p> <p>Check that accumulation is cleared following the six hourly observation and when the hourly timer is reset.</p>	
2. Running Time Meter AMOS	Check reading of meter and compare reading and data taken during previous maintenance visit.	Check log for any time that a. c. power was removed from equipment.
3. Processor	<p>Check that power on indicator lamp is on.</p> <p>Check power supply blower motor, air movement and noise.</p> <p>Check for high quality chassis ground connection at binding post at rear of Processor chassis.</p> <p>Check regulated +4.75V a. c. between TP102 &amp; TP101, ground.</p>	<p>A good earth ground is imperative to maintain low noise signal within the Processor.</p> <p>Adjust R1 for +4.75V d. c.</p>
4. Processor - Precipitation (PA) Module	Place station on local line for local typewriter printout.	This procedure will ready the station for operation at initial power on, or after battery power has been re - moved.



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 SEMIANNUAL
 

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What to Check	How to Check	Precautions & Remarks
	<p>Install test jumper between TP1 and TP2 on teletype module. (While jumper is installed, Parity Check Lamp indication is not valid.)</p> <p>Place Test-Operate switch, S1 (3 position) in Normal-Single Observation position. Bat handle to left looking at component side of board.</p> <p>To test if the PA module will clear:</p> <p><u>On Clock Module:</u></p> <p>Depress S1 to simulate the beginning of an hourly window.</p> <p>Depress S2 to simulate the end of an hourly window.</p> <p><u>On PA Module:</u></p> <p>Depress S2 to power clock monitor lamps.</p> <p>Momentarily depress S1 to advance clock counter manually to read 5th hour of 6 hourly interval.</p> <p>Read time in binary 1,2,4 from left to right viewing component side of board.</p>	<p>On PA module, hour counter cannot be advanced while one hour window is present.</p> <p>On Clock module, S1 will begin window and S2 will end window.</p>

EHB-11  
Issuance 76-3

## ANNUAL

What to Check	How to Check	Precautions & Remarks
1. Processor - To Test Modes	On Teletype Module: (with Jumper installed)	Install Jumper into TP1 and TP2.
	Place S1 in Single Character position, bat handle to right looking at component side of board.	Single Teletype Character Test, in sequence only.
	Depress S2 to simulate station call-printout is a character of each actuation of S2.	Normal-Single Observation, message is completed, then stop at end of message.
	Place S1 in Normal-Single Observation position. Bat handle to left looking at component side of board.	Run Continuous position. Printout is total message, continuously repeating.
	Depress S2 -message will complete if not completed in step 2.	Always return S1 to Normal-Single Observation position after all tests. Remainder of message is completed.
	Place S1 in Run Continuous position. Bat handle in center position.	When the station is "on" the Teletype line, the AMOS Processor chassis should always be operated in its normal horizontal position. The Station Call and Teletype Line Relays have mercury-wetted contacts, and their operation is, therefore, sensitive to position. While a catastrophic failure will not result with the chassis tilted as much as 45°, the relay could cause undesirable Teletype Line distortion.
	Depress S2 to simulate station call.	
	Place S1 in Normal -Single Observation position, bat handle to left.	
	Remove Jumper. (Dis-engagement of Jumper will give station call and print-out of a single message.)	

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What to Check	How to Check	Precautions & Remarks
	Place station on operational Teletype line.	
	Station will respond when called through Station Call Input.	
2. Processor	Check that the power on Indicator Lamp is on.	
3. Clock Module	Change the mercury cell for the 214 Accutron Clock.	
	Set the 6 hour timer on the PA module to read present hour of the 6 hourly interval.	
4. 4.5V Power Supply	Measure +4.5V dc between TP131 and TP130, ground.	Adjust R1 for +4.5V dc .
5. Direction Sensor Orientation	Compute true north as described in Federal Meteorological Handbook No. 5, Chapter A3. Remove sensor from adaptor and install orientation device. Align North markings with mast adapter and tighten orientation device set screw. Loosen adaptor mounting screws. At precisely true noon, check and adjust, if necessary, mounting adaptor on mast until true noon shadow of pin above azimuth plate falls directly over North mark (0°) on the orientation device plate. Tighten mast adaptor set screws and reinstall direction transmitter.	<p>This should be performed on a clear day and only at true noon.</p> <p><u>NOTE:</u> An apparent error in direction, after the mounting adaptor is orientated, should not be compensated for by readjusting the adaptor.</p>

## ANNUAL

What to Check	How to Check	Precautions & Remarks
6. Direction Sensor	Visually inspect the sensor and interconnecting cables for condensation, oil leakages and cracks or punctures.	If the sensor is leaking oil, fails the torque test, has wobble in the shaft, squeaks or chatters, replace it.
7. Torque	Check the starting torque with the Torque Watch. Rotate the sensor shaft through 360° clockwise, and observe that the peak torque reading does not exceed 0.05 in-oz. Repeat the procedure in the counter clockwise direction.	
8. Speed Sensor	Visually inspect the sensor and interconnecting cables for condensation, cracks and punctures.	If the sensor fails the torque test, has wobble in the shaft, squeaks or chatters, replace it.
9. Torque	Check the starting torque with the Torque Watch. Rotate the sensor shaft through 360° clockwise, and observe that the peak torque reading does not exceed 0.05 in-oz. Repeat the procedure in the counter clockwise direction.	
10. Precipitation	Inspect tipping bucket rain gage. Check accumulator by operating tipping bucket and comparing teletype copy.  Check that the accumulation is cleared following the 6 hourly observation and when the hourly timer is reset.	

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 ANNUAL
 

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What to Check	How to Check	Precautions & Remarks
	Check conditions of heater elements and thermostats.	
11. Direction Sensor North Alignment Procedure	<p>Connect the Direction Sensor to the processor using the test cable in Figure 1 of this procedure.</p> <p>Lock the Damper Ring in the North position by aligning the Light Switch Modules to each other and then inserting the locking screws. (Figure 2)</p> <p>Apply the a.c. power to the Direction Sensor and observe that the interrupter MP-15 is turning.</p> <p>Set the oscilloscope Sync input to "+" External. Connect the Zero Reference Pulse output of the Direction Sensor to the External Trigger Input.</p> <p>Set the oscilloscope sweep to 1 ms/cm. Set the vertical sensitivity to 1 v/cm using a 1: 1 scope probe.</p> <p>Connect the Vane Position Pulse output to the vertical Signal Input and set the scope coupling control to "d.c. "</p>	Figures 1 and 2 are at the end of this procedure.

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 ANNUAL
 

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What to Check	How to Check	Precautions & Remarks
	Adjust the scope Sweep Trigger and Stability controls until a sweep is triggered each time the interrupter passes the Light Switch Module of the Zero Reference Pulse.	
	Adjust the Vertical Positioning Controls until the leading edge of the Vane Position Pulse is observed on the scope.	
	Observe the time in milliseconds between the start of the scope trace and the appearance of the Vane Position Pulse leading edge. It should be within 5 milliseconds.	
	If the leading edge is not within 5 milliseconds of the start of the sweep, perform the following procedure:	
	Note the amplitude of the sweep trace. If the level is +5.0 volts, it denotes the Vane Position Pulse is occurring before the Zero Reference Pulse. If the level is 0 volts, it denotes the Vane Position Pulse is occurring after the Zero Reference Pulse.	
	Loosen the set screw which locks the Zero Reference Pulse Light Switch Module. Adjust this module until the leading edge of the Vane Position Pulse occurs within 5 milliseconds of the start of the sweep.	

## ANNUAL

What to Check	How to Check	Precautions & Remarks
	Once the Vane Position Pulse has been properly aligned, tighten the set screw. Again verify that the leading edge of the pulse is occurring within 5 milliseconds of the beginning of the sweep.	
	The Direction Sensor is now set electrically North and this completes the alignment.	
12. Altimeter Setting Indicator	Check that the transmitted value agrees with the indicated altimeter setting to within $\pm 0.04''$ Hg.	
13. Ice Bath Check	Make temperature and dewpoint checks in bath of slushy crushed ice. Temperature system should indicate $32^{\circ} \pm 0.5^{\circ}\text{F}$ . Dewpoint system should indicate $-15 \pm 0.5^{\circ}\text{F}$ .	Make this check also if discrepancies cannot be attributed to lines.

Attachments: Fig. 1, Wind Direction Sensor Special Test Cable  
 Fig. 2, Damper Ring Locking Screws

EHB-11  
 Issuance 76 - 3

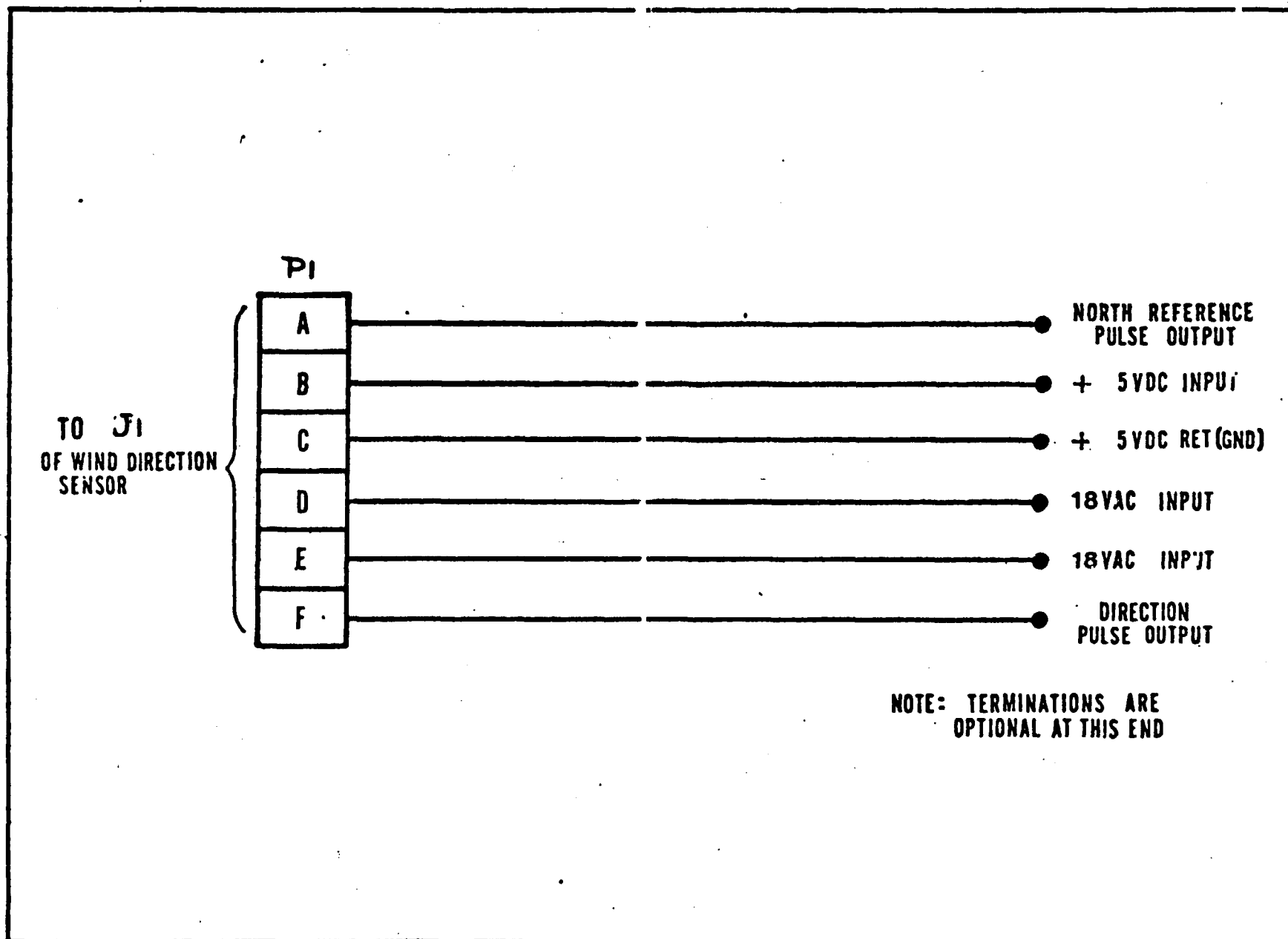


Figure 1. Wind Direction Sensor Special Test Cable



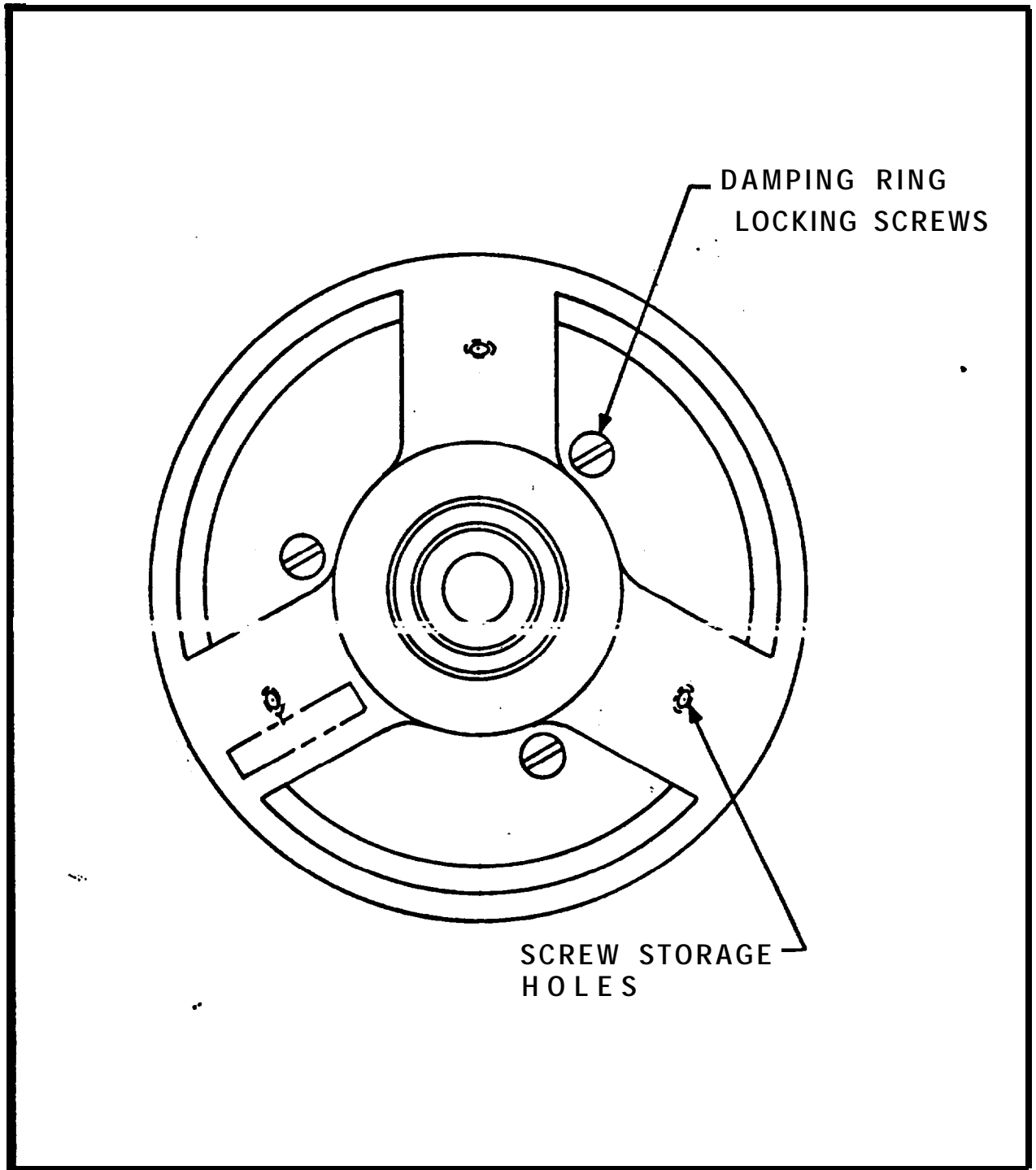


Figure 2. Damper Ring Locking Screws



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL WEATHER SERVICE  
Silver Spring, Md. 20910

July 24, 1979

OA/W514 - RLH

TO: All NWS Regional Headquarters, Area Electronics Supervisors,  
and Electronics Technicians.

FROM: O/AW514- Roger L. Hill

SUBJECT: EHB-11, Issuance 79-7

ACTION: Give Attachment to Station MIC, HIC, or OIC

Due to an oversight in our distribution of the subject issuance only one copy instead of two copies of the Met Tech Schedule was included. Attached copy should be given to station MIC/HIC/OIC for either the Met Tech or the station Duty Manual depending upon what was done with the initial copy.

Attachment: 1 Copy of Meteorological Technician Portion of  
EHB-11 Issuance 79-7



U. S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL WEATHER SERVICE  
SILVER SPRING, MD. 20910

Office of Technical Services

December 19, 1978  
W514

MAINTENANCE SCHEDULE FOR THE AUTOB SYSTEMS  
(For Meteorological Technician)

DAILY		
What to Check	How to Check	Precautions & Remarks
1. Teletype Copy	Check for garbling or Incorrect AUTOB transmission. Switch printers or TD's to correct any garbling.	Notify FAA technician on teletype trouble and WS El Tech on AUTOB trouble.
WEEKLY		
1. Temperature and Dew Point	Compare temperature and dew point observed at nearby stations with those transmitted by AUTOB	Limits are $\pm 2^{\circ}\text{F.}$ for comparison checks at a site remote from AUTOB Thermal shield and $1.5^{\circ}\text{F.}$ for checks made at thermal shield site.
2. Precipitation	Check that accumulator clears after six hourly observation. Confirm that correct precipitation is transmitted.	Notify El Tech if accumulator is not reset . Restart timer.
3. Altimeter Setting	Check that transmitted value agrees with the indicated altimeter setting to within $\pm 0.04''$ Hg.	(Use mercurial or precision aneroid for comparison checks.) Notify El Tech If indicated and transmitted values are different.
4. Wind Speed	Observe wind speed and direction to insure they agree with transmitted values.	Notify El Tech if wind speed error is greater than $\pm 4$ knots, or wind direction error is greater than $\pm 10^{\circ}$ . (Measurement of wind data must be longer than one minute of duration for comparison.)



U.S. DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL WEATHER SERVICE  
Silver Spring, Md. 20910

W514

**August 23, 1976**

SUBJECT: Transmittal Memorandum for Engineering Handbook No. 11, Issuance 76- 4

TO : All Regional Headquarters, Electronic Program Officers, and Electronics Technicians

1. Material Transmitted:

Engineering Handbook No. 11 - Automatic Observing Equipment, Section 4.1;  
Corrections to the Maintenance Schedule for the AMOS III-73 Systems.

2. Summary:

The present Maintenance Schedule for the AMOS III-73 contains a few discrepancies. The included pages are for replacement in the present schedule of the pages in error.

3. Effect on Other Instructions:

Engineering Handbook No. 11 - Automatic Observing Equipment, Section 4.1;  
Maintenance Schedule for the AMOS III-73 Systems, Electronics Technician Section, pages 1, 2, 5, 6 and 9.

Merritt N. Techter  
Associate Director, Technical Services, W5



EHB-11  
Issuance 76- 4

U. S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL WEATHER SERVICE  
SILVER SPRING, MD. 20910

Office of Technical Services  
Engineering Division

July 29, 1976  
W514

MAINTENANCE SCHEDULE FOR THE AMOS III-73 SYSTEMS  
(FOR ELECTRONICS TECHNICIAN)

QUARTERLY		
What to Check	How to Check	Precautions & Remarks
1. Teletype Copy	Check for garbling or incorrect AMOS transmission. Switch printers, if possible.	
2. Dewcell Bobbin	Replace with spare processed bobbin.	It is imperative that the dewcell bobbins be kept in their containers with the desiccant when not powered up.

NOTE: The requirement for maintenance of the dewcell bobbins is scheduled for quarterly maintenance, but is flexible. The maintenance interval should be adjusted as required for individual stations.

The optimum period for processing the dewcell bobbin in the AMOS III-73 will vary with the environment. The bobbin should be replaced when the dewpoint reading is suspected of being in error in comparison with a sling psychrometer (or equivalent).

These bobbins must be carefully washed. Familiarity with Maintenance Notes 16 and 17 in the EHB-8, H061, Section 2.5, is a necessity in caring for dewcells. After washing the bobbin it must be dried, preferably in an oven at 150°. Saturate the dry bobbin with the lithium chloride 8% solution and dry it again in the oven. When dry place it immediately in its plastic container with desiccant. The bobbin should be kept in its container until ready for use. Contamination of the bobbin will render it useless. Normally, one hour will be sufficient to dry the dewcell bobbin.

EHB-11  
Issuance 76 -4

## SEMIANNUAL

What to Check	How to Check	Precautions &, Remarks
1. Precipitation	Inspect tipping bucket rain gage. Check accumulator by operating tipping bucket and comparing teletype copy.  Check that accumulation is cleared following the six hourly observation and when the hourly timer is reset.	
2. Running Time Meter AMOS	Check reading of meter and compare reading and data taken during previous maintenance visit.	Check log for any time that ac power was removed from equipment.
3. Processor	Check that power on indicator lamp is on.  Check power supply blower motor, air movement and noise.  Check for high quality chassis ground connection at binding post at rear of processor chassis.  Check regulated +4.75V dc between TP102 &, TP101, ground.	This applies to the AMOS III-70 processor power supplies.  A good earth ground is imperative to maintain low noise signal within the processor.  Adjust R1 for +4.75V dc
4. Processor - Precipitation (PA) Module	Place station on local line for local typewriter printout.	This procedure will ready the station for operation at initial power on, or after battery power has been removed.

## ANNUAL

What to Check	How to Check	Precautions & Remarks
	Place station on operational teletype line.	
	Station will respond when called through Station Call Input.	
2. Processor	Check that the power on indicator lamp is on.	
3. Clock Module	Change the mercury cell in the 214 Accutron clock.	
	Set the 6-hour timer on the PA module to read present hour of the 6-hourly interval.	
4. 4.5V Power Supply	Measure +4.5V dc between TP131 and TP130, ground.	Adjust R3 for +4.5V dc on the 1A2A17 Battery Charger Regulator Board.
5. Direction Sensor Orientation	Compute true north as described in Federal Meteorological Handbook No. 5, Chapter A3. Remove sensor from adaptor and install orientation device. Align North markings with mast adapter and tighten orientation device set screw. Loosen adaptor mounting screws. At precisely true noon, check and adjust, if necessary, mounting adaptor on mast until true noon shadow of pin above azimuth plate falls directly over North mark (0°) on the orientation device plate. Tighten mast adaptor set screws and reinstall direction transmitter.	This should be performed on a clear day and only at true noon.

ANNUAL		
What to Check	How to Check	Precautions & Remarks
6. Direction Sensor	Visually inspect the sensor and interconnecting cables for condensation, oil leakages and cracks or punctures.	If the sensor is leaking oil, fails the torque test, has wobble in the shaft, squeaks or chatters, replace it.
7. Torque	Use the Torque Watch handle as the point of thrust and rotate the sensor shaft through 360° clockwise. Observe that the peak torque reading does not exceed 0.05 in-oz. Repeat the procedure in the counterclockwise direction.	Refer to EHB No. II, Section 2.4, Maintenance Note No.2.
8. Speed Sensor	Visually inspect the sensor and interconnecting cables for condensation, cracks and punctures.	If the sensor fails the torque test, has wobble in the shaft, squeaks or chatters, replace it.
9. Torque	Slowly rotate the vane shaft using the Torque Watch handle as the point of thrust application. Rotate the shaft through 360° clockwise and observe that the peak torque reading does not exceed 0.05 inch-ounces. Repeat the procedure in the counterclockwise direction.	
10. Precipitation	Inspect tipping bucket rain gage. Check accumulator by operating tipping bucket and comparing teletype copy.  Check that accumulation is cleared following the 6-hourly observation and when the hourly timer is reset.	



## ANNUAL

What to Check	How to Check	Precautions & Remarks
	Once the Vane Position Pulse has been properly aligned, tighten the set screw. Again verify that the leading edge of the pulse is occurring within 5 milliseconds of the beginning of the sweep.	
	The Direction Sensor is now set electrically North and this completes the alignment.	
12. Altimeter Setting Indicator	Check that the transmitted value agrees with the indicated altimeter setting to within $\pm 0.03''$ Hg.	At manned stations, obtain the correct ASI reading from the observer. At unmanned stations a portable barometer will be provided at a later date.
13. Ice Bath Check	Make temperature and dewpoint checks in bath of slushy crushed ice. Temperature system should indicate $32^{\circ} \pm 0.5^{\circ}\text{F}$ . Dewpoint system should indicate $-15 \pm 0.5^{\circ}\text{F}$ .	Make this check also if discrepancies cannot be attributed to lines.

Attachments: Fig. 1, Wind Direction Sensor Special Test Cable  
 Fig. 2, Damper Ring Locking Screws

<i>Issue Date</i>	<i>Org. Code</i>
2-5-92	W/OS032

# NATIONAL WEATHER SERVICE

## Engineering Handbook

<i>Program</i>	<i>Part</i>	<i>Section</i>
EHB-11	04	4.2

MAINTENANCE SCHEDULE INDEX - AMOS III-70/73

Date of Issue

Title

July 7, 1983

Maintenance Schedule for the AMOS Systems



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL WEATHER SERVICE  
Silver Spring Md. 20910

July 7, 1983

W/OTS141 - TEC

TO: All NWS Regional Headquarters, Area Electronics Supervisors,  
and Electronics Technicians (EHB-11 Distribution)

FROM: W/OTS1 - J. Michael St. Clair *J. M. St. Clair*

SUBJECT: Transmittal Memorandum for Engineering Handbook NO. 11,  
Issuance 83-2

1. Material Transmitted:

Engineering Handbook No. 11 - Automatic Observing Equipment, Section 4.2, Maintenance Schedule for the AMOS Systems.

2. Summary:

This maintenance schedule has been prepared for the use of all personnel operating and maintaining AMOS Systems. It should be placed in Section 4.2. The Meteorological Technician portion is printed on green paper. The Electronics Technician portion is printed on yellow paper. Two copies of the Meteorological Technician portion and one copy of the Electronics Technician portion should be attached to each copy of the Transmittal Memorandum. One copy of the Meteorological Technician's part of the schedule should be detached and given to the station MIC/HIC/OIC to be inserted in the Station Duty Manual (SDM), Volume 11.

3. Effect on Other Instructions:

This issuance supersedes the "Maintenance Schedule for AMOS Systems," dated April 30, 1976, which should be discarded.

EHB-11  
Issuance 83-2



Engineering Division  
W/OTS14

MAINTENANCE SCHEDULE FOR THE AMOS III-73 SYSTEMS  
(For Meteorological Technicians)

DAILY (Unmanned Stations)		
What to Check	How to Check	Precautions & Remarks
1. Teletype Copy	Check for garbling or incorrect AMOS transmission. Switch printers or TD's to correct any garbling.	Notify FAA technician of teletype trouble and WS el tech of AMOS trouble.
2. All Parameters		Notify el tech if values are suspect.
DAILY (Manned Stations)		
1. Teletype Copy	Check for garbling or incorrect AMOS transmission. Switch printers or TD's to correct any garbling.	Notify FAA technician of teletype trouble and WS el tech of AMOS trouble.
2. Manual Input	Check all controls for proper operation. Manual input portion of message shall be transmitted exactly as set on the rotary switches.	Note message coded on rotary switches must be validated during 5-minute window prior to AMOS interrogation.
WEEKLY (Manned Stations)		
1. Temperature and Dewpoint	Compare temperature and dew-point observed at the instrument shelter with those transmitted by AMOS.	Limits are $\pm 2$ degrees F. for comparison checks at a site remote from AMOS thermal shield and 1.5 degrees F. for checks made at thermal shield site.
2. Precipitation	Check that accumulator clears after six hourly observation. Confirm that correct precipitation is transmitted.	Notify el tech if accumulator is not reset. Restart timer.

EHB-11  
Issuance 83-2  
7-7-83

## WEEKLY (Manned Stations)

What to Check	How to Check	Precautions & Remarks
3. Altimeter Setting Indicator.	Check that transmitted value agrees with the indicated altimeter setting to within $\pm 0.04$ " Hg.	(Use mercurial or precision aneroid for comparison checks.) Notify el tech if indicated and transmitted values are different.
4. Wind Speed and Direction.	Observe wind speed and direction to ensure they agree with transmitted values.	Notify el tech if wind speed error is greater than +4 knots, or wind direction error is greater than +10 degrees. (Measurement of wind data must be longer than one minute of duration for comparison.)

Engineering Division  
W/OTS14

MAINTENANCE SCHEDULE FOR THE AMOS III-73 SYSTEMS  
(For Meteorological Technicians)

DAILY (Unmanned Stations)		
What to Check	How to Check	Precautions & Remarks
1. Teletype Copy	Check for garbling or incorrect AMOS transmission. Switch printers or TD's to correct any garbling.	Notify FAA technician of teletype trouble and WS el tech of AMOS trouble.
2. All Parameters		Notify el tech if values are suspect.
DAILY (Manned Stations)		
1. Teletype Copy	Check for garbling or incorrect AMOS transmission. Switch printers or TD's to correct any garbling.	Notify FAA technician of teletype trouble and WS el tech of AMOS trouble.
2. Manual Input	Check all controls for proper operation. Manual input portion of message shall be transmitted exactly as set on the rotary switches.	Note message coded on rotary switches must be validated during 5-minute window prior to AMOS interrogation.
WEEKLY (Manned Stations)		
1. Temperature and Dewpoint	Compare temperature and dew-point observed at the instrument shelter with those transmitted by AMOS.	Limits are $\pm 2$ degrees F. for comparison checks at a site remote from AMOS thermal shield and 1.5 degrees F. for checks made at thermal shield site.
2. Precipitation	Check that accumulator clears after six hourly observation. Confirm that correct precipitation is transmitted.	Notify el tech if accumulator is not reset. Restart timer.

EHB-11  
Issuance 83-2  
7-7-83

## WEEKLY (Manned Stations)

What to Check	How to Check	Precautions & Remarks
3. Altimeter Setting Indicator.	Check that transmitted value agrees with the indicated altimeter setting to within $\pm 0.04''$ Hg.	(Use mercurial or precision aneroid for comparison checks.) Notify el tech if indicated and transmitted values are different.
4. Wind Speed and Direction.	Observe wind speed and direction to ensure they agree with transmitted values.	Notify el tech if wind speed error is greater than $\pm 4$ knots, or wind direction error is greater than $\pm 10$ degrees. (Measurement of wind data must be longer than one minute of duration for comparison.)

MAINTENANCE SCHEDULE FOR THE AMOS III-73 SYSTEMS

(For Electronics Technicians)

QUARTERLY		
What to Check	How to Check	Precautions & Remarks
1. Teletype Copy	Check for garbling or incorrect AMOS transmission. Switch printers, if possible.	
2. Dewcell Bobbin	Replace with spare processed bobbin.	It is imperative that the dewcell bobbins be kept in their containers with the desiccant when not powered up.

NOTE: There are two types of dewcell transducers in use. One has a permanent bobbin and the other a replaceable bobbin. The text refers to the replaceable bobbin, but the permanent bobbin applies as well. The requirement for maintenance of the dewcell bobbins is scheduled for quarterly maintenance, but is flexible. The maintenance interval should be adjusted as required for individual stations.

The optimum period for processing the dewcell bobbin in the AMOS III-73 will vary with the environment. The bobbin should be replaced when the dewpoint reading is suspected of being in error in comparison with a sling psychrometer (or equivalent).

These bobbins must be carefully washed. Familiarity with Maintenance Notes 16 and 17 in the EHB-8, H0-61, Section 2.5, is a necessity in caring for dewcells. After washing the bobbin it must be dried, preferably in an oven at 150 degrees. Saturate the dry bobbin with the lithium chloride 7% solution and dry it again in the oven. When dry place it immediately in its plastic container with desiccant. The bobbin should be kept in its container until ready for use. Contamination of the bobbin will render it useless. Normally, one hour will be sufficient to dry the dewcell bobbin.

SEMI ANNUAL	
1. Precipitation	<p>Inspect tipping bucket rain gage. Check accumulator by operating tipping bucket and comparing teletype copy.</p> <p>Check that accumulation is cleared following the six hourly observation and when the hourly timer is reset.</p>



## SEMI ANNUAL (continued)

What to Check	How to Check	Precautions & Remarks
2. Running Time Meter AMOS	Check reading of meter and compare reading and date taken during previous maintenance visit.	Check log for any time that ac power was removed from equipment.
3. Processor	<p>Check that POWER ON indicator lamp is on.</p> <p>Check power supply blower motor for air movement and noise.</p> <p>Check for high quality chassis ground connection at binding post at rear of Processor chassis.</p> <p>Check regulated +4.75V dc between TP102 and TP101, ground.</p>	<p>This applies to the AMOS III-70 Processor power supplies.</p> <p>A good earth ground is imperative to maintain low noise signal within the Processor.</p> <p>Adjust R1 for +4.75V dc.</p>
4. Processor-Precipitation (PA) Module	<p>Place station on local line for local typewriter printout.</p> <p>Install test jumper between TP1 and TP2 on Teletype Module. (While jumper is installed, Parity Check Lamp indication is not valid.)</p> <p>Place Test-Operate Switch, S1 (3 position) in Normal-Single Observation position. S1 switch to left looking at component side of board.</p> <p>To test if the PA Module will clear:</p> <p><u>On Clock Module:</u></p> <p>Depress S1 to simulate the beginning of an hourly window.</p>	<p>This procedure will ready the station for operation at initial power on, or after battery power has been removed.</p> <p>Remove jumper. Disengagement of jumper will give Station Call and a printout of a single message.</p> <p>On PA Module, hour counter cannot be advanced while one hour window is present.</p>

## SEMI ANNUAL

What to Check	How to Check	Precautions & Remarks
	Depress S2 to simulate the end of an hourly window.	On Clock Module S1 will begin window and S2 will end window.
	<u>On PA Module:</u> Depress S2 to power clock monitor lamps.	
	Momentarily depress S1 to advance clock counter manually to read fifth hour of six hourly interval.	
	Read time in binary 1, 2, 4 from left to right viewing component side of board.	

## ANNUAL

1. Processor - To Test Modes	<u>On Teletype Module:</u> (with jumper installed)	Install jumper into TP1 and TP2.
	Place S1 in Single Character position, S1 switch to right looking at component side of board.	Single Teletype Character Test, in sequence only.
	Depress S2 to simulate station call-printout is a character of each actuation of S2.	Normal-Single Observation, message is completed, then stop at end of message.
	Place S1 in Normal-Single Observation position. S1 switch to left looking at component side of board.	Run Continuous position. Printout is total message, continuously repeating.
	Depress S2 - message will complete if not completed in Step 2.	Always return S1 to Normal-Single Observation position after all tests. Remainder of message is completed.
	Place S1 in Run Continuous position. S1 switch in center position.	When the station is "on" the Teletype line, the AMOS Processor chassis should always be operated in its normal horizontal position.

## ANNUAL (continued)

What to Check	How to Check	Precautions & Remarks
	Depress S2 to simulate Station Call.	The Station Call and Teletype Line Relays have mercury-wetted contacts, and their operation is, therefore, sensitive to position. While a catastrophic failure will not result with the chassis tilted as much as 45 degrees, the relay could cause undesirable Teletype Line distortion.
	Place S1 in Normal-Single Observation position, S1 switch to left.	
	Remove Jumper. (Disengagement of Jumper will give station call and printout of a single message.)	
	Place station on operational teletype line.	
	Station will respond when called through Station Call Input.	
2. Processor	Check that the POWER ON indicator lamp is on.	
3. Clock Module		
(a) 1A2A1	Change the mercury cell in the 214 Accutron clock.	
(b) 1A2A1A	Check battery in Processor.	
	Set the six hour timer on the PA Module to read present hour of the six hourly interval.	
4. Power Supply 4.5V DC	Measure +4.5V dc between TP131 and TP130, ground.	Adjust R3 for +4.5V dc on the 1A2A17 Battery Charger Regulator Board.
5. Direction Sensor Orientation	Compute true north as described in Federal Meteorological Handbook No. 5, Chapter A3. Remove sensor from adaptor and install orientation device. Align North markings with mast adaptor and tighten orientation device set screw. Loosen adaptor mounting screws. At precisely true noon, check and adjust, if necessary, mounting	This should be performed on a clear day and only at true noon.

## ANNUAL (continued)

What to Check	How to Check	Precautions & Remarks
	adaptor on mast until true noon shadow of pin above azimuth plate falls directly over North mark (0°) on the orientation device plate. Tighten mast adaptor set screws and reinstall direction transmitter.	
6. Direction Sensor	Visually inspect the sensor and interconnecting cables for condensation, oil leakages and cracks or punctures.	If the sensor is leaking oil, fails the torque test, has wobble in the shaft, squeaks or chatters, replace it.
7. Torque	Use the Torque Watch Handle as the point of thrust and rotate the sensor shaft through 360° clockwise. Observe that the peak torque reading does not exceed 0.05 inch-ounces. Repeat the procedure in the counterclockwise direction.	Refer to EHB-11, Section 2.4 Maintenance Note No. 2.
8. Speed Sensor	Visually inspect the sensor and interconnecting cables.	
9. Torque	Slowly rotate the vane shaft using the Torque Watch Handle as the point of thrust application. Rotate the shaft through 360° clockwise and observe that the peak torque reading does not exceed 0.05 inch-ounces. Repeat the procedure in the counterclockwise direction.	If the sensor fails the torque test, has wobble in the shaft, squeaks or chatters, replace it.
10. Precipitation	Inspect tipping bucket rain gage. Check accumulator by operating tipping bucket and comparing teletype copy.  Check that accumulation is cleared following the six hourly observation and when the hourly timer is reset.	

## ANNUAL (continued)

What to Check	How to Check	Precautions & Remarks
	Check conditions of heater elements and thermostats.	
11. Direction Sensor North Alignment Procedure.	<p>Connect the Direction Sensor to the processor using the test cable in Figure 1 of this procedure.</p> <p>Lock the Damper Ring in the North position by aligning the Light Switch Modules to each other and then inserting the locking screws. (Figure 2)</p> <p>Apply the ac power to the Direction Sensor and observe that the interrupter MP-15 is turning.</p> <p>Set the oscilloscope Sync input to "+" External. Connect the Zero Reference Pulse output of the Direction Sensor to the External Trigger Input.</p> <p>Set the oscilloscope sweep to 1 ms/cm. Set the vertical sensitivity to 1 v/cm using a 1 :1 scope probe.</p> <p>Connect the Vane Position Pulse output to the Vertical Signal input and set the scope coupling control to dc.</p> <p>Adjust the scope Sweep Trigger and Stability controls until a sweep is triggered each time the interrupter passes the Light Switch Module of the Zero Reference Pulse.</p> <p>Adjust the Vertical Positioning Controls until the leading edge of the Vane Position Pulse is observed on the scope.</p>	Figures 1 and 2 are at the end of this procedure.

## ANNUAL (continued)

What to Check	How to Check	Precautions & Remarks
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Observe the time in milliseconds between the start of the scope trace and the appearance of the Vane Position Pulse leading edge. It should be within five milliseconds.

If the leading edge is not within five milliseconds of the start of the sweep, perform the following procedure:

NOTE the amplitude of the sweep trace. If the level is +5.0 volts, it denotes the Vane Position Pulse is occurring before the Zero Reference Pulse. If the level is 0 volts, it denotes the Vane Position Pulse is occurring after the Zero Reference Pulse.

Loosen the set screw which locks the Zero Reference Pulse Light Switch Module. Adjust this module until the leading edge of the Vane Position Pulse occurs within five milliseconds to the start of the sweep.

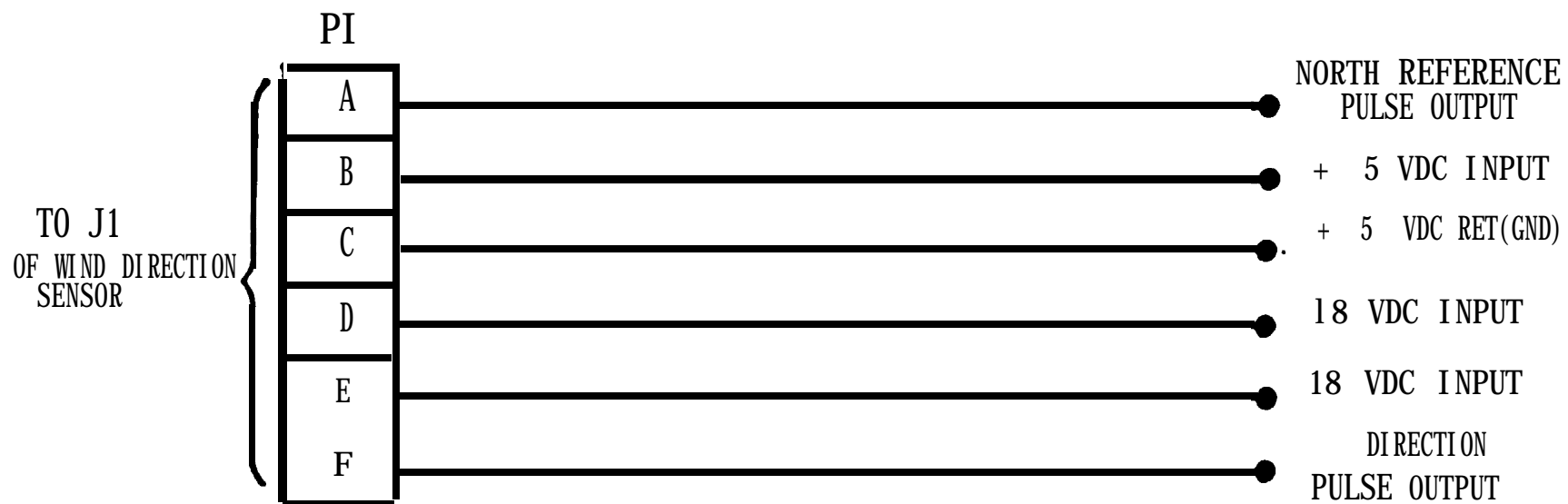
Once the Vane Position Pulse has been properly aligned, tighten the set screw. Again verify that the leading edge of the pulse is occurring within five milliseconds of the beginning of the sweep.

The Direction Sensor is now set electrically North and this completes the alignment.

## ANNUAL (continued)

What to Check	How to Check	Precautions & Remarks
12. Altimeter Setting	Check that the transmitted value agrees with the indicated altimeter setting to within $\pm 0.04$ " Hg.	At manned stations, obtain the correct AS1 reading from the observer. At unmanned stations a portable calibrated barometer will be provided by MIC/OIC.
13. Ice Bath Check	Make temperature and dewpoint checks in bath of slushy crushed ice. Temperature system should indicate $32^{\circ} \pm 0.5^{\circ}\text{F}$ . Dewpoint system should indicate $-15 \pm 0.5^{\circ}\text{F}$ .	Use this check also if discrepancies cannot be attributed to lines.

Attachments: Figure 1, Wind Direction Sensor Special Test Cable  
Figure 2, Damper Ring Locking Screws



NOTE: TERMINATIONS ARE  
OPTIONAL AT THIS END

Figure 1. Wind Direction Sensor Special Test Cable



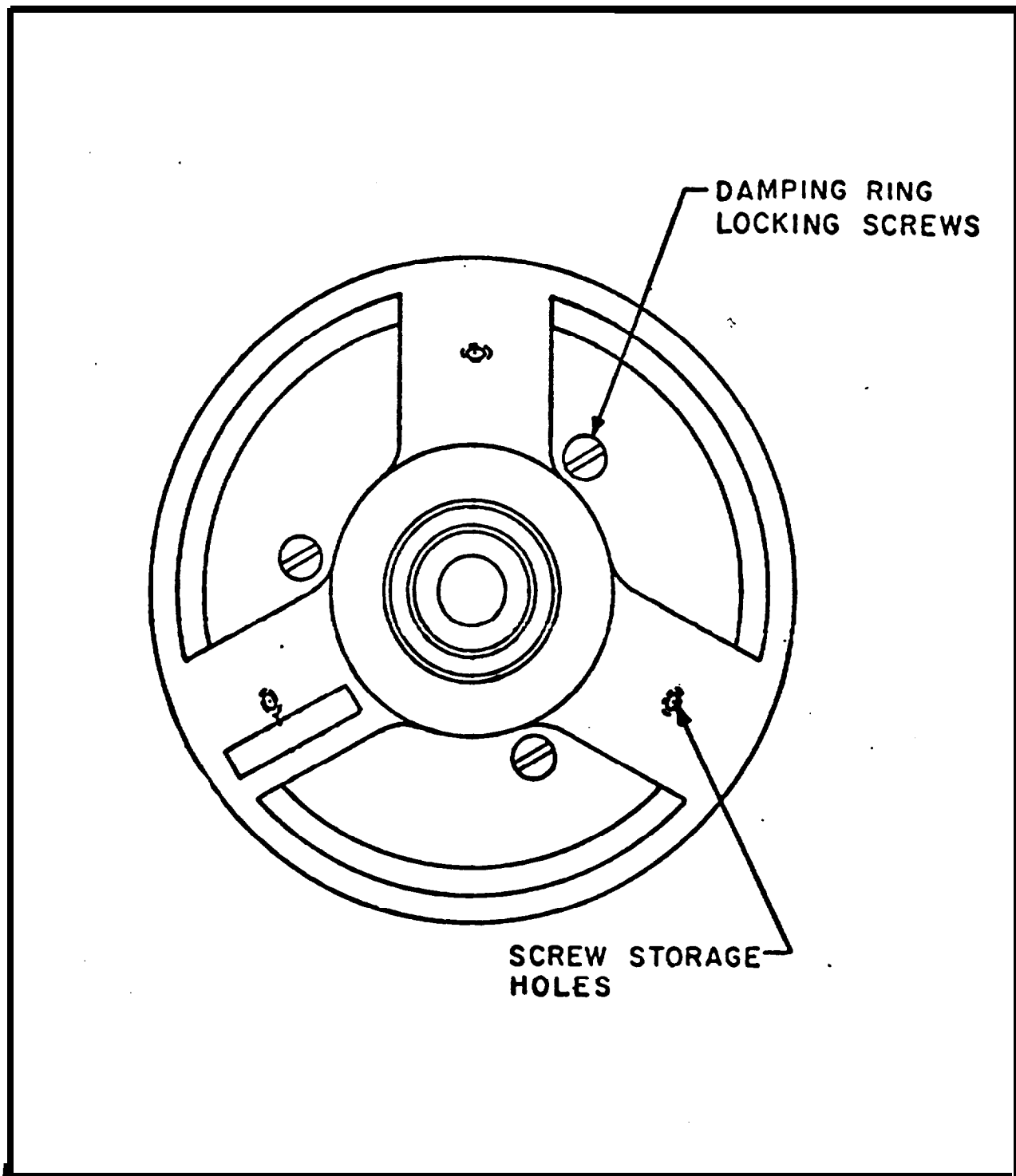


Figure 2. Damper Ring Locking Screws

<i>Issue Date</i>	<i>Org. Code</i>
2-5-92	W/OS032

# NATIONAL WEATHER SERVICE

## Engineering Handbook

<i>Program</i>	<i>Part</i>	<i>Section</i>
EHB-11	04	4.3

### MAINTENANCE SCHEDULE INDEX - RAMOS

Date of Issue

Title

March 28, 1979

Maintenance Schedule for RAMOS Systems

MAINTENANCE SCHEDULE FOR THE RAMOS SYSTEMS  
(For Electronics Technicians)

QUARTERLY		
What to Check	How to Check	Precautions & Remarks
1. RAMOS Message	Check for garbling or incorrect RAMOS transmission. Switch printers, if possible.	
2. Dewcell Bobbin	Replace with spare processed bobbin.	It is imperative that the dewcell bobbins be kept in their containers with the desiccant when not powered up.

NOTE: The requirement for maintenance of the dewcell bobbins in the RAMOS System will vary with the environment. The bobbin should be replaced when the dewpoint reading is suspected of being in error in comparison with a sling psychrometer (or equivalent).

These bobbins must be carefully washed. Familiarity with Maintenance Notes 16 and 17 in the EHB-8, H061, Section 2.5, is a necessity in caring for dewcells. After washing the bobbin it must be dried, in an oven at 150°. Saturate the dry bobbin with the lithium chloride 8% solution and dry it again in the oven. When dry place it immediately in its plastic container with desiccant. The bobbin should be kept in its container until ready for use. Contamination of the bobbin will render it useless. Normally, one hour will be sufficient to dry the dewcell bobbin.

SEMIANNUAL		
1 . Field Location Mechanical Tower	Visual Inspection of Tower, Enclosures, Sensors, and grounds.	Check for a physical damage or vandalism .

EHB-11  
Issuance 79-2

## SECTION 4.3

## AUTOMATIC OBSERVING EQUIPMENT RAMOS)

## SEMIANNUAL

What to Check	How to Check	Precautions & Remarks
2. Field Location Electrical (Enclosures)		
a. Line Voltage	DVM	115V ac $\pm$ 5 volt
b. GelCel Batteries	DVM	12Vdc $\pm$ .5
c. IPSI Commercial Pwr Supply	DVM	27V dc Power Supply should be set for 1.5 amps. See RAMOS Maintenance Note No. 2.
d. 1A1A1 Power Supply Module	DVM	Check dc Voltage output for: + 15 Volts - 15 Volts + 5 Volts
e. 1A2 Battery Equalizer	DVM	Check voltages to batteries. Outputs are +27V and 13.5V.
3. Sensor Modules	RAMOS Maintenance Test Set	Refer to RAMOS Instruction Manual Vol. 2, Page 2-13 for checking B E A .
a. Q Precipitation (Tipping Bucket) (2A6)	Visual	Operate tipping by hand and observe S1 activating. Feel funnel for heater operation if applicable.
b . Wind Speed (2A4)	Remove the Wind Speed Sensor from the adapter and remove the cups. Connect the output of the Sensor to a DVM. Pin A to + and Pin C to - . Couple the shaft to the F850 Wind Speed Calibrator and rotate at 900 R P M .	The DVM should read .75 volts at 900 RPM and .50 volts at 608 RPM. <u>NOTE:</u> This test is similar to that of the F420 Wind System. A different output plug and coupler connectors will have to be obtained for the F850 Wind Speed Calibrator.

## SEMIANNUAL

What to Check	How to Check	Precautions & Remarks
c. Wind Direction (2A3)	<p>Remove Sensor from Adapter on Tower mounting strut.</p> <p>Connect DVM between "A-B", "A-C" and "B-C" of plug on Wind Direction Sensor</p> <p>Connect DVM between "D-E" of plug on Wind Direction Sensor.</p> <p>Connect DVM between "A-D" of plug on Wind Direction Sensor.</p> <p><i>0.25 ohms?</i></p>	<p>Resistance should measure 2.25K ohm <math>\pm 2\%</math> between each combination.</p> <p>Resistance should measure 2.50K ohm <math>\pm 2\%</math> and should not vary more than 2% as shaft is turned.</p> <p>Resistance should read its lowest value when the vane would be pointed toward pin MP11. This would be North. Resistance will be near <u>50 ohms.</u> ?</p>
d. Dewpoint (2A2)	RAMOS Maintenance Test Set	Refer to RAMOS Instruction Manual Vol. 2, Page 2-14, Sensor display in position 03. Compare reading against a Sling Psychrometer $\pm 1^\circ$ .
e. Temperature (2A1)	RAMOS Maintenance Test Set	Same as for the Dewpoint with the exception of Sensor Display. Position should be in 02.
f. Pressure (1A1A9)	Not used at present	

## SECTION 4.3

## AUTOMATIC OBSERVING EQUIPMENT (RAMOS)

## SEMIANNUAL

What to Check	How to Check	Precautions & Remarks
g. COMMS - Dedicated Line (3A1)	Determine that the RAMOS COMMS answers or does not answer before proceeding to RAMOS Field Site.	Carry spare interface card 3A1.
h. COMMS - Dial-Up (3A1)	Determine if RAMOS COMMS answers or does not answer before proceeding to RAMOS Field Site.  Check operation of phone and pick-up solenoid.	Arrange a preset time for Central Station to call RAMOS while at the Field Site.
i. COMMS - VHF (3A1)	Determine if RAMOS COMMS answers or does not answer before proceeding to RAMOS Field Site.  Check GelCel Battery voltage.  Transceiver	+12v $\pm$ .5v  Listen for rushing noise on VOICE position. This is an indication Transceiver is working.
i. COMMS - DCPRS (3A1)	Determine if RAMOS can be interrogated by GOES.  Address RAMOS through DCPRS Test Set and RAMOS Maintenance Test Set	Check with NWSHQ Data Systems Division (FTS 427-7792).  Watch RAMOS Test Set for Indication of Interrogation.
<b>4. <u>Central Station</u></b>		
a. Interrogation Device (5A1)	Check operation through a Silent 700 Terminal.	Refer to RAMOS Instruction Manual Vol. 3 for the operational description of the device.

EHB-11

Issuance 79- 2

SEMIANNUAL		
What to Check	How to Check	Precautions & Remarks
b. COMMS VHF (3A1)	Call up with Silent 700	Refer to RAMOS Instruction Manual Vol. 3 for appropriate maintenance procedures as per Manufacturer's Instructions.

ANNUAL		
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NOTE: Perform all SEMIANNUAL checks for the RAMOS System and at the same time proceed with the additional few steps added to the mentioned sensors.

#### 1. Field Location

a. Wind Direction (Starting Torque) (2A3)	Check the starting torque with a Waters torque watch coupled to the shaft.	Starting torque should not exceed 1.2 ounce-inches.
b. Wind Direction Orientation	<p>Compute True North as described in FMH No. 5, Chapter A3. Remove Wind Direction Sensor from adapter and install the F860 Orientation Device. Align North markings with mast adapter and carefully tighten orientation device set screw.</p> <p>At precisely True Noon, set the Wind Direction mounting adapter to read 5° East of True North. Tighten set screws on the adapter and remove the F860 device.</p>	The F860 is used in the F420 Wind System and with caution it can be used with the RAMOS Wind System. The set pin on the adapter will align with the North scribed line on the F860.
c. Wind Speed (Starting Torque) (2A4)	Check the starting torque with a Waters torque watch coupled to the shaft.	Starting torque should not exceed 1.0 ounce-inches

## ANNUAL

What to Check	How to Check	Precautions & Remarks
d. Temperature and Dewpoint Sensors (2A1-2A2) Ice Bath	Make temperature and dewpoint checks in bath of slushy crushed ice. Temperature system should indicate $32^{\circ} \pm 0.5^{\circ}\text{F}$ . Dewpoint system should indicate $-15 \pm 0.5^{\circ}\text{F}$ .	Check through RAMOS BEA with RAMOS Maintenance Test Set
<b>2. <u>Field Location</u></b>		
B E A		
a. Wind Direction Module (1A1A7).	Refer to RAMOS Instruction Manual Vol. 2, Page 2-190 Calibration Procedure.	Recalibrate per instructions if suspect of being inaccurate.
b. Wind Speed Module (1A1A8)	Refer to RAMOS Instruction Manual Vol. 2, Page 2-198 Calibration Procedure.	Recalibrate per instructions if suspect of being inaccurate.
c. Peak Wind Module (1A1A14)	Refer to the Interim description of the Peak Wind Module which was sent to all RAMOS stations.  Contained in the interim description is an alignment procedure for this module.	Recalibrate per instructions of the interim description if the Peak Module reading obtained on the RAMOS Maintenance Test Set is suspected of being in error.
d. Pressure (1A1A9)	Not used at present.	
e. Precipitation Accumulation (1A1A10)	Determine if precipitation count increased from the value noted in Step 3 and 3a of the Semiannual check	Change Module if no difference in reading is obtained when stepped through the RAMOS Maintenance Test Set.



ANNUAL		
What to Check	How to Check	Precautions & Remarks
f. Precipitation Yes/No (1A1A11)	RAMOS Maintenance Test Set.	Should indicate Yes.
<div><div><u>NOTE:</u></div><div>Refer to RAMOS Instruction Manual Vol. 3, for information on Commercial COMMS Equipment for any annual maintenance requirements.</div></div>		



U.S. DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL WEATHER SERVICE  
Silver Spring, Md. 20910

March 28, 1979

OA/W5141-LE

TO: All NWS Regional Headquarters, Area Electronic Supervisors,  
and Electronics Technicians (EHB-11 Distribution)

FROM: OA/W51 -J.M. St. Clair

SUBJECT: Transmittal Memorandum for Engineering Handbook No. 11,  
Issuance 79-2

1. Material Transmitted:

Engineering Handbook No. 11 - Automatic Observing Equipment, Section 4.1;  
Maintenance Schedule for the RAMOS Systems.

2. Summary:

This maintenance schedule has been prepared for the use of all personnel in the operation and maintenance of the RAMOS Systems.. It comprises the minimum periodic checking and servicing considered necessary to assure dependable operation. If local conditions warrant it, more frequent checks should be made. One copy of the Meteorological Technician's part of the schedule should be detached and given to the station MIC/HIC/ OIC to be inserted in the Station Duty Manual (SDM), Volume II. The Meteorological and Electronics Technicians' functions have been printed on contrasting colored pages for ready identification.

3. Effect on Other Instructions:

None.

EHB-11  
Issuance 79- 2



MAINTENANCE SCHEDULE FOR THE RAMOS SYSTEMS  
(For Meteorological Technicians)

D A I L Y		
What to Check	How to Check	Precautions & Remarks
1. RAMOS Message	Check for garbling or incorrect RAMOS transmission.	Notify NWS El Tech of any incorrect RAMOS Message.
2. RAMOS Parameters	Check RAMOS Message for correct sensor information for conditions existing at RAMOS location.	

<i>Issue Date</i>	<i>Org. Code</i>
2-5-92	W/OS032

# NATIONAL WEATHER SERVICE

## Engineering Handbook

<i>Program</i>	<i>Part</i>	<i>Section</i>
EHB-11	04	4.4

MAINTENANCE SCHEDULE INDEX - MANUAL ENTRY DEVICE

Date of Issue

Title

May 30, 1979

MED Maintenance Schedule



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL WEATHER SERVICE  
Silver Spring, Md. 20910

May 30, 1979

OA/W514 - GR

TO: All NWS Regional Headquarters, Area Electronics Supervisors,

FROM: OA/W514- J.M. St. Clair *J.M. St. Clair*

SUBJECT: Transmittal Memorandum for Engineering Handbook No. 11,  
Issuance 79-6

1 . Material Transmitted:

Engineering Handbook No. 11, Automatic Observing Equipment, Section 4.4;  
MED Maintenance Schedule.

2. Summary:

The MED Maintenance Schedule provides the EI Techs with maintenance checks which must be performed at regularly scheduled intervals to ensure optimum performance. It will detect and clear equipment degradation in order to prevent failures from occurring. The MED will operate with either a RAMOS or AMOS System and incorporates both systems into the schedule. The Meteorological Technician portion is printed on green paper. The EI Tech portion is printed on yellow paper.

3. Effect on Other instructions:

None.

EHB- 11  
Issuance 79- 6



Engineering Division  
W514

May 1, 1979

MED MAINTENANCE SCHEDULE  
(For Meteorological Technicians)

WEEKLY

What to Check	How to Check	Precautions &, Remarks
1 . MED Display and Panel	Wipe front panel and display with a dry, lint-free cloth	Ensure all controls are properly secured to prevent entry of dust and dirt.

NOTE: If display or panel is  
excessively dirty, clean  
with a mild commercial-  
type cleaner.

EHB-11  
Issuance 79-6

Engineering Division  
W 5 1 4

May 1, 1979

MED MAINTENANCE SCHEDULE  
(For Electronics Technicians)

Scheduled maintenance includes checks which must be performed at regularly scheduled intervals to ensure peak equipment performance. The MED Maintenance Schedule for the AMOS and RAMOS are nearly identical. Both systems are included in the following maintenance schedule.

NOTE: Most RAMOS and AMOS Systems are scheduled on a Semiannual basis to recharge the dewcells even though the existing Maintenance Schedules have a Quarterly recharge time. The MED Maintenance Schedule will address only a Semiannual interval.

SEMIANNUAL		
What to Check	How to Check	Precautions & Remarks
1 . MED Display for AMOS	MED Power Switch to ON position	a. AMOS Displayed on line 1. b. Lines 2, 3, 6, 7, and 8 are blank. c. AMOS data entered on lines 4 and 5. d. VALIDATED LED is not illuminated.
	Type in "CHECKOUT" via the MED Keyboard	Lines 4 and 5 blank out and refill with AMOS data.
	Observe display	Every 30 seconds, lines 4 and 5 blank out and refill with AMOS data.
	Depress VALIDATE Key on MED Keyboard	VALIDATED LED lights
	Observe display for one minute.	Lines 4 and 5 of display do not change. (No updating of AMOS data)
	Interrogate MED via teletype on local loop 1	a. MED display contents are transmitted EHB-11 Issuance 79-6

## SECTION 4.4

## AUTOMATIC OBSERVING EQUIPMENT (MED)

What to Check ( Semiannual)	How to Check	Precautions & Remarks
		to teletype (display may flicker during transmission .)
		b. VALIDATED LED extinguishes.
	Depress VALIDATE Key on MED Keyboard.	VALIDATED LED lights.
	Depress RESET pushbutton on the rear of the MED unit	a. Display clears except AMOS on line 1. b. AMOS data appears on lines 4 and 5. c. MED Sonalert gives a short "beep. " d. VALIDATED LED extinguished.
	Enter "1234567890 - + WERTYU10" via MED Keyboard	Entered characters appear on line 1 behind cursor.
	Enter "P" via MED Keyboard	a. Short "beep" from MED Sonalert letter b. Letter "P" added. to line 1.
	Depress RETURN Key on MED	Cursor moves to beginning of next line. Lines 4 and 5 are excluded to cursor and keyboard).
	Enter "ASDFGHJKLZXCVBNM/" via keyboard	Entered characters appear on line 2 behind cursor.
	Depress and hold the SHIFT Key while depressing "1", "6", and "7", Keys on MED Keyboard.	Arrows (as on top half of keys) appear on display behind cursor.



## SEMIANNUAL

What to Check	How to Check	Precautions &, Remarks
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## 2. Power Supply

## Voltage Checks

+5V	TB2-2(+) & TB2-6(-)	4.97 to 5.23V
+12V	TB2-3(+) & TB2-6(-)	11.4 to 12.6V
+30V	TB2-4(+) & TB2-6(-)	28.5 to 31.8V
-12V	TB2-7(+) & TB2-6(-)	-11.4. to -12.6V
-250V	TB2-8(+) & TB2-6(-)	-237.5 to -265V
-9.1V	Anode of Power CR102 and TB2-6(-)	-8.19 to -10.01V

## ANNUAL

1. MED Display for AMOS	Same as Semiannual Checks
----------------------------	---------------------------

## SEMIANNUAL


1. MED Display for RAMOS	MED Power Switch	a. AMOS displayed on line 1 b. Lines 2, 3, 6, 7, and 8 are blank. c. RAMOS data entered on lines 4 and 5. (NOTE: The MED reformats the RAMOS message into the AMOS for- mat. d. VALIDATED LED is <u>not</u> illuminated
	Type in "CHECKOUT" via the MED Keyboard	Word "CHECKOUT" appears on display behind cursor.
	Depress DATA UPDATE Key on MED Keyboard.	Lines 4 and 5 blank out and refill with RAMOS data.

EHB-11  
Issuance 79- 6

## SECTION 4.4

## AUTOMATIC OBSERVING EQUIPMENT (MED)

## SEMIANNUAL

What to Check	How to Check	Precautions & Remarks
	Observe Display	Every 60 $\pm$ 10 seconds, lines 4 and 5 blank out and refill with RAMOS data.
	Depress VALIDATE Key on MED Keyboard.	VALIDATED LED lights.
	Observe display for two minutes.	Lines 4 and 5 of display do not change. (No updating of RAMOS data)
	Interrogate MED via teletype on local loop	a. MED display contents are transmitted to teletype. (Display may flicker during transmission). b. VALIDATED LED extinguishes
	Depress VALIDATE Key on MED Keyboard	VALIDATED LED lights.
	Depress RESET pushbutton on the rear of the MED unit.	a. Display clears except AMOS  on line 1. b. RAMOS data appears on lines 4 and 5. c. MED Sonalert gives a short "beep". d. VALIDATED LED extinguished.
	Enter "1234567890 - + WERTYU10" from keyboard	Entered characters appear on line 1 behind cursor.
	Enter "P" via MED Keyboard.	a. Short "beep" from MED Sonalert . b. Letter "P" added to line 1.

## SEMIANNUAL

What to Check	How to Check	Precautions & Remarks
	Depress RETURN Key on Keyboard	Cursor moves to beginning of next line. (Lines 4 and 5 are excluded to cursor and keyboard. )
	Enter "ASDFGHJKLZXCVBNM/" via keyboard.	Entered characters appear on line 2 behind cursor.
	Depress and hold the SHIFT key while depressing "1", "6", and "7" keys on MED Keyboard.	Arrows (as on top half of keys) appear on display behind cursor.
	Depress each of the four red cursor Control (arrow) Keys.	Cursor moves as indicated by arrow. (Lines 4 and 5 are excluded to cursor and Keyboard .)

2. Power Supply  
Voltage Checks

+5V	TB2-2(+) & TB2-6(-)	4.97 to 5.23V
+12V	TB2-3(+) & TB2-6(-)	11.4 to 12.6V
+30V	TB2-4(+) & TB2-6(-)	28.5 to 31.8V
-12V	TB2-7(+) & TB2-6(-)	-11.4 to -12.6V
-250V	TB2-8(+) & TB2-6(-)	-237.5 to -265V
-9.1V	Anode of Zener CR102 and TB2-6 (-)	-8.19 to -10.01V

3. PCB 1A3  
Clock Battery

Remove top cover of MED.  
Battery mounted in a clip.

Replace battery.

## ANNUAL

1. MED Display  
for RAMOS

Same as Semiannual Checks.



**U.S. DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
NATIONAL WEATHER SERVICE  
Silver Spring, Md. 20910

October 5, 1989

W/OS0321 - TEC

TO: All Electronics Program Managers, Area Electronics Supervisors,  
and Electronic Technicians (EHB-11 Distribution)

FROM: W/OS03 - J. Michael St. Clair *J. M. St. Clair*  
Chief, Engineering Division

SUBJECT: Pressure Sensor Replacement at AMOS/RAMOS Sites

REFERENCE: W/OS0141: BIW memorandum dated October 15, 1986, same subject

The reference memo, with attachments, is forwarded for your information.

Attachments

cc:

W/OS031 - R. Ahlberg  
W/OS031 - M. Christopher  
W/OS0321 - B. McCormick  
W/OS033 - I. D. Jones






**U.S. DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
NATIONAL WEATHER SERVICE  
Silver Spring, Md. 20910

OCTOBER 15, 1986

WOSO141: BI W

MEMORANDUM FOR: RICHARD AHLBERG  
GROUP LEADER - SURFACE/HYDRO  
ENGINEERING DESIGN BRANCH

FROM:   
JAMES L. LEHMANN  
SURFACE OBSERVATIONS PROGRAM LEADER  
OBSERVING SYSTEMS BRANCH

SUBJECT: PRESSURE SENSOR REPLACEMENT AT  
AMOS/RAMOS SITES

AS PER OUR CONVERSATION, ATTACHED ARE THREE LISTS INDICATING  
THE FOLLOWING:

- A. AMOS/RAMOS SITES WHERE PRESSURE SENSOR REPLACEMENT  
IS TO BE SUPPORTED;
- B. AMOS/RAMOS SITES WHERE PRESSURE SENSOR REPLACEMENT  
IS NOT TO BE SUPPORTED; AND
- C. AMOS/RAMOS SITES WHERE SENSOR REPLACEMENT OF ANY  
KIND IS NOT TO BE SUPPORTED AT ALL.

IF YOU HAVE ANY QUESTIONS, PLEASE CALL ME OR BONNIE WYATT AT  
427-7792.

ATTACHMENTS

CC :  
W/OS031 - G. SNYDER  
W/OS031 - B. SPENCER  
W/OS0321 - T. CAVANAGH  
W/ER4 - J. BILLET  
W/SR4 - D. DAVIS  
W/CR4 - D. WHITMAN  
W/WR4 - R. RICHEY  
W/AR12 - R. UNRUH  
W/PR12 - M. TAKATA





**U.S. DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
NATIONAL WEATHER SERVICE  
Silver Spring, Md. 20910

March 14, 1986

W/OTS141 - TC

TO: All NWS Regional Headquarters, Area Electronics Supervisors, and  
Electronics Technicians (EHB-11 Distribution)

FROM: W/OTS14 - J. Michael St. Clair

SUBJECT: Transmittal Memorandum for Engineering Handbook No. 11, Issuance 86- 2

1. Material Transmitted:

Revised index pages for Engineering Handbook No. 11.

2. Summary:

Handbook No. 11 - Revisions implement additions and/or deletions to Index  
Pages of Engineering Handbook No. 11.

3. Effect on Other Instructions:

Replaces affected index pages in EHB-11.

EHB-11  
Issuance 86-2



## AUTOMATIC OBSERVING EQUIPMENT

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## PART I

## AUTOMATIC OBSERVING (EHB-11)

1. Equipment Manuals. Equipment or systems manuals are provided with each piece of operational equipment used in the National Weather Service. Each manual includes sufficient instructions so that technicians not familiar with the equipment can satisfactorily accomplish installation, necessary adjustments and calibration, activation, routine and emergency maintenance, and can easily identify components for ordering replacements. As a minimum, manuals contain information regarding (a) description and characteristics of the equipment; (b) siting and installation requirements; (c) activation, adjustment, and operation; (d) description of circuits utilized; (e) preventive and troubleshooting maintenance procedures, including resistance and voltage measurements and mechanical adjustments; (f) detailed circuit diagrams; (g) detailed parts list indicating parts numbers, together with electrical and mechanical descriptions.

Manuals are issued by the National Weather Service Engineering Division whenever new equipment is installed, when sufficient changes in manual material require a complete revision, or by request from authorized personnel whose responsibilities have changed, thus requiring their having access to additional technical material. Manuals will normally be revised when sufficient change in the material is brought about through equipment modification, change in technical procedures and from suggestions obtained from the field requesting clarification of vague or erroneous information.

Distribution of equipment manuals in the automatic observing program area is made on a selective basis. Normally only those electronics technicians actually maintaining the equipment will be issued manuals. One copy is provided with the equipment and remains in the custody of the station.

All equipment manuals will be numerically coded so as to be keyed to the appropriate program area handbook. The indexes contained in Part I for the various systems and equipment manuals indicate the numbers assigned to a particular manual. As new manuals are obtained, they will carry the coded number on the cover as a reference.

The recipient of equipment manuals will be responsible for their upkeep as regards filing of revised material and ensuring that they are current. Area electronics supervisors will periodically check electronics technicians' manuals for completeness and have them request any revisions that are missing. Request for manuals should be made through the regional headquarters engineering branch to the National Weather Service Headquarters Engineering Division (ATTN: W/OTS14). Manuals should be requested only for equipment under the technician's responsibility.



W/OTS14

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MANUAL INDEX - AUTOB

Number

Title

11-103(A-A59)

AUTOB Appendi x

## MANUAL INDEX - AMOS III-70

<u>Number</u>	<u>Title</u>
11-102	AMOS 3-70
	VOLUME I -
	Part I - AMOS 3-70 System
	Part II - AMOS 3-70 Processor
	VOLUME II -
	Part I - AMOS 3-70 Wind Direction Sensor
	Part II - AMOS 3-70 Wind Speed Sensor
	VOLUME III - AMOS 3-70 Pressure Sensor
	VOLUME IV - AMOS 3-70 Manual Entry Device and Final Remarks Device

## MANUAL INDEX - AMOS III-73

NumberTitle

11-103

AMOS III-73

Volume 1

Section 1. General Information  
 Section 2. Operation  
 Section 3. Theory of Operation  
 Section 4. Scheduled Maintenance  
 Section 5. Installation

Volume 2

Family Tree Diagram  
 Overall Block Diagram  
 Troubleshooting Maintenance Flow Chart  
 Major Function Block Diagrams  
 System Interconnect Diagram  
 Schematic Diagrams  
 Maintenance Dependency Charts  
 Wiring Diagram  
 Parts Data and Parts Location

Inserts (11-103)

Change 12 to AMOS Manual (Mod #7)

## MANUAL INDEX - RAMOS

<u>Number</u>	<u>Title</u>
11-104	RAMOS VOLUME I, Support Volume
	Section 1. General Information
	Section 2. Operation
	Section 3. Theory of Operation
	Section 4. Installation
	RAMOS VOLUME II, Troubleshooting/Repair.
	Family Tree Diagram
	Overall Block Diagrams
	Troubleshooting Maintenance Flow Charts
	Major Function Block Diagrams
	Schematic Diagrams
	Wiring Diagram
	Maintenance Dependency Charts
	Parts Data and Parts Location
	RAMOS VOLUME III, Troubleshooting/Repair
	Schematic Diagrams
	Parts Data and Parts Location
	Maintenance Dependency Charts
	Manufacturer's Manuals

## MANUAL INDEX - MANUAL ENTRY DEVICE

<u>Number</u>	<u>Title</u>
11-105	MED Manual Entry Device Type A, Volume I -Support Volume Type A, Volume II -Troubleshooting/Repair Volume
11-105*	MED Manual Entry Device Type B - Depot Repair Volume
June 6, 1980	Errata Sheet #1 to MED Manual
Nov. 18, 1980	Change to Table of Contents, MED Manual Type A, Volume I.

\*Not Available to Field

## Part 2

## AUTOMATIC OBSERVING (EHB-11)

2. Equipment Maintenance Notes. Maintenance Notes serve to establish day-to-day procedures regarding maintenance activities carried out by electronics technicians, and to augment technical material presented in equipment manuals. They function as a communications device to assist technicians in following the correct procedures established in calibrating and maintaining electronic and electromechanical systems. Maintenance notes provide information generally not found in other sources and are basically the means by which technicians are kept informed of changes relating to specific equipment and systems for which they have maintenance responsibility. They are issued only by the National Weather Service Headquarters Engineering Division, the sole authorized organization for establishing maintenance policy, and are distributed to all electronics technicians and on a selective basis to other predesignated organizational units having a requirement for the information.

Revisions to existing material are made to enhance maintenance effectiveness and to update obsolete technical information. Input for maintenance notes is derived from operational experience obtained through various reporting channels, suggestions from field technicians who are maintaining a particular class of instruments, and through the experience of highly technical specialists and engineers engaged in managing the maintenance program at the regional and WS Headquarters level. In essence, maintenance notes are developed from numerous inputs throughout the organization and constitute an important supplement to other technical documents.

Notes are issued by equipment types for ease of reference, and are consecutively numbered by date of issue. The area electronics supervisor will periodically check that each electronics technician has available all current notes. Missing material should be requested through the regional headquarters from the NOAA Logistics Supply Center (NLSC).

## MAINTENANCE NOTE INDEX - AUTOB

<u>Number</u>	<u>Date of Issue</u>	<u>Title</u>
1	April 3, 1979	AUTOB (AMOS) Pressure Sensor Location
2	April 30, 1979	Corrections for both the Videograph Manuals

## MAINTENANCE NOTE INDEX - AMOS III-70/73

<u>Number</u>	<u>Date of Issue</u>	<u>Title</u>
1	August 1, 1974	AMOS 3-70/73 Maintenance Notes
2	August 1, 1974	Wind Speed/Direction Sensor Torque Threshold Test
3	August 1, 1974	AMOS 3-70 Pressure Sensor, Vacuum/Pressure Pump
4	August 1, 1974	AMOS 3-70 Pressure Sensor, Scanner Range Verification
5	April 5, 1976	Zero Set Adjustment for the Rosemount Pressure Sensor
6	March 2, 1977	AMOS III-73 Temperature and Dewpoint Calibration
7	May 17, 1977	AMOS III-73 Preventive Maintenance Teletype Clock and Ten Second One Shot
8	May 17, 1977	Correction to AMOS III-73 Dewpoint Sensor Schematic
9	June 16, 1977	AMOS III-73 Precaution to be observed when servicing Processor Drawer
10	August 24, 1977	Correction to AMOS III-73 Dewpoint Sensor Schematic
11	March 14, 1978	Battery Charger Regulator 1A2A17
12	April 12, 1978	Temperature Sensor S007-2A3
13	July 14, 1978	Corrections to AMOS III-70/73 Maintenance Notes 1 through 4
14	September 28, 1978	Corrections to Prior Maintenance Notes



## MAINTENANCE NOTE INDEX - AMOS III-70/73

<u>Number</u>	Date of Issue	<u>Title</u>
15	September 28, 1978	Unmanned AMOS Stations
16	April 20, 1981	LED substitution for Miniature Lamp.
17	March 12, 1982	Lithium Chloride Solution Change

## MAINTENANCE NOTE INDEX - RAMOS

<u>Number</u>	<u>Date of Issue</u>	<u>Title</u>
1	September 8, 1978	Maintenance Philosophy
2	September 6, 1978	Adjustments to 1PS1 Power Supply Assembly
3	December 11, 1978	Parity Error in Magnavox DCPRS
4	February 28, 1979	Second Space in Message Format
5	March 15, 1982	Lithium Chloride Solution Change

## MAINTENANCE NOTE INDEX - MANUAL ENTRY DEVICE

<u>Number</u>	<u>Date of Issue</u>	<u>Title</u>
1	March 14, 1980	AMOS MED Window
	June 6, 1982	Errata Sheet #1
2	June 17, 1980	RAMOS MED Tone Level Adjustment
	July 30, 1984	MED Maintenance Note #2, Rev. #1: RAMOS MED Tone Level Adjustment, 84-4
3	August 5, 1980	RAMOS-MED Precipitation and Peak Wind Reset Problem
4	September 24, 1980	MED Extender Boards

## PART 3

## AUTOMATIC OBSERVING (EHB-11)

3. Equipment Modification Notes. Modification Notes are the only documents serving to authorize the installation of modifications to instrumental equipment and systems. They provide the step-by-step installation instructions to be followed by authorized personnel in altering circuit and mechanical configurations of equipment. The purpose of any modification is either to enhance safety, maintainability, reliability, or incorporate a change necessitated by an operational requirement not previously designed into the equipment. Most modifications are the result of monitoring field reports relating to equipment failures and operational effectiveness. Other inputs result from suggestions submitted by electronics technicians and regional headquarters staffs. State-of-the-art changes are incorporated through National Weather Service Headquarters Engineering personnel efforts to extend the useful life of equipment and to overcome logistics problems.

Copies of all modification instructions are provided to each electronics technician so he will have available the necessary information to perform the modification if equipment is encountered that has not previously been modified. The instructions are issued in numerical sequence by date and by equipment type. In this manner rapid verification by the technician will determine whether all modification notes have been received and incorporated into the equipment. Copies of missing modification notes should be requested through the NOAA Logistics Supply Center (NLSC).

## MODIFICATION INDEX - AUTOB

<u>Number</u>	<u>Date of Issue</u>	<u>Title</u>
1	August 20, 1979	Capacitor Cl Change in CPU
2	March 13, 1981	Backscatter Visibility Sensor Digitizer
3	March 16, 1981	Backscatter Visibility Processor 1A2A5
	April 17, 1981	Errata Sheet No. 1 to AUTOB Modification No. 2 and No. 3
4	July 1, 1982	Disable Phase Discriminator

## MODIFICATION INDEX - AMOS III-70/73

<u>Number</u>	<u>Date of Issue</u>	<u>Title</u>
1	March 29, 1977	Change in Pulse Width of Pulse Generator
2	January 25, 1978	Addition of OR Gate 1A-A to the 1-PG-1 Circuitry of the AS1 Module
3	November 19, 1979	Temperature Sensor Aspiration
4	June 11, 1980	Power On Pulses
5	October 28, 1982	Viking Connectors for Dewpoint Probe Cable
6	September 24, 1984	1A2A1 Clock Replacement
7	September 20, 1985	Conversion to RS232C Communications
8	April 19, 1985	AMOS Precipitation Accumulation Module, Reset Elimination



**U.S. DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
NATIONAL WEATHER SERVICE  
Silver Spring, Md. 20910

October 22, 1986

W/OS0141: BI W

MEMORANDUM FOR: Richard Ahlberg  
Group Leader - Surface/Hydro  
Engineering Design Branch  
*Jim Lehmann*  
FROM: James L. Lehmann  
Surface Observations Program Leader  
SUBJECT: Pressure Sensor Replacement at  
AMOS/RAMOS sites  
REFERENCE: W/OS0141: BI W memorandum dated October 15, 1986,  
same subject

An error has been cited on LIST B of the reference document. Cody, WY (COD) appears on LIST B, "AMOS/RAMOS SITES WHERE PRESSURE SENSOR REPLACEMENT IS NOT TO BE SUPPORTED." Cody, WY should appear on LIST A, "AMOS/RAMOS SITES WHERE PRESSURE SENSOR REPLACEMENT IS TO BE SUPPORTED."

Please make a note of this change, and take appropriate action.

Thanks.

CC:  
W/SOS31 - G. Snyder  
W/OS031 - B. Spencer  
W/OS0321 - T. Cavanagh  
W/ER4 - J. Billet  
W/SR4 - D. Davis  
W/CR4 - D. Whitman  
W/WR4 - R. Richey  
W/AR12 - R. Unruh  
W/PR12 - M. Tskata



DO MAKE PRESSURE SENSOR REPLACEMENTS

AVAILABLE FOR THESE SITES

CODY, WY (COD) (per 10/22/86

MARSEILLES, IL (MMO)

SIDNEY, NE (SNY)

VALENTINE, NE (VTN)

CHICAGO (MIDWAY), IL (MDW)

WORCHESTER, MA (ORH)

BLOCK ISLAND, HI (BID)

MOLOKAI, HI (MKK)

FRENCH FRIGATE SHOALS, HI (1Z6)

BURNS, OK (BNO)

FLAGSTAFF, AZ (FLG)

LEWISTON, ID (LWS)

PENDLETON, OR (PDT)

BLUE CANYON, CA (BLU)

KINGMAN, AZ (IGM)

PAGE, AZ (PGA)

SEXTON SUMMIT, OR (SXT)

STAMPEDE PASS, WA (SMP)

WINSLOW, AZ (INW)

GALVESTON, TX (GLS)

MARFA, TX (MRF)

TRUTH OR CONSEQUENCES, NM (TCS)

COTULLA, TX (COT)

BIG DELTA, AK (BIG)

DILLINGHAM, AK (DLG)

GULKANA, AK (GKN)

ILIAMNA, AK (IL1)

UNALAKLEET, AK (UNK)



LIST B (CONTINUED)

DO NOT HAVE PRESSURE SENSOR REPLACEMENTS AVAILABLE  
FOR THESE SITES

GILLETTE, WY (GCC)

~~CODY, WY (COD)~~ (per 10/22/86 memo)

CHALLIS, ID (U15)

MT- SHASTA, CA (MHS)

SANDBERG, CA (SDB)

WENDOVER, AZ (ENV)

SAFFORD, AZ (E74)

FT. DODGE, IA (FOD)

ANILAK, AK (ANI)

MIDDLETON ILS, AK (MDO)

NENANA, AK (ENN)

PORT HEIDEN, AK (PTH)

ANATUVAK PASS, AK (AKP)

ANDREAFSKI, AK (SMA)

CAPE DECISION, AK (CDE)

CAPE SPENCER, AK (CSP)

ELDRED ROCK, AK (ERO)

NIKOLSKI, AK (IKO)

POINT RETREAT, AK (PRT)

SHUNGNAK, AK (SHG)

FT. YUKON, AK (FYU)

LI ST B (CONTI NUED)

LEMMON, SD (Y22)  
CUSTER, SC (OVI )  
REDI G, SD (REJ)  
BIG PINEY, WY (BP1)  
YELLOWSTONE LAKE, WY (P60)  
CRAI G, CO (CAG)  
LUKEVI LLE, AZ (P65)  
POINT PIEDRAS BLANCAS, CA (87Q)  
ELK CITY, I D (P69)  
JORDAN, MT (JDN)  
CALI ENTE, NV (P38)  
EUREKA, NV (P68)  
MEACHAM, OR (MEH)  
ROME, OR (P88)  
PRI CE, UT (PUC)  
McCALL, I D (MYL)  
KAI LUA-KONA, HI (K53)  
KI LAUEA, HI (OZ5)

LIST C

DO NOT SUPPORT THESE SITES AT ALL

HALFWAY ROCK, ME (P74)	REPLACED WITH C-MAN
CLARKSBURG, WV (CKB)	NON FAA RESPONSIBILITY
DRY TORTUGAS (P73)	REPLACED WITH C-MAN
MT. DESERT ROCK, ME (21B)	REPLACED WITH C-MAN
CHESAPEAKE, L-S- (W39)	REPLACED WITH C-NAN
FRYING PAN SHOALS (46W)	REPLACED WITH C-MAN
JACKSON, KY (JKL)	EQUIPMENT MOVED, NOW OV1
TUPELO, MS (TUP)	EQUIPMENT MOVED, NOW Y22
SUMMIT, AK (UMM)	NO LONGER EXISTS
CAPE ST. ELIAS, AK (5CE)	NO LONGER EXISTS
CAPE HINCHINBROOK, AK (5HN)	NO LONGER EXISTS
SOUTH POINT, HI (P62)	NO LONGER EXISTS
	REPLACED WITH K53, KAI LUA-KONA

<b>Issue Date</b> 2-2-93	<b>Org. Code</b> W/OS032
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# NATIONAL WEATHER SERVICE

## Engineering Handbook

<b>Program</b>	<b>Part</b>	<b>Section</b>
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